COAL AGE

Vol. 9 NEW YORK, MARCH 18, 1916 No. 12

The Broken Rule

Two men lay at the face of a breast; one was seriously injured, and the other was gasping in a dying voice for his wife. They had gone back to a "missed hole," and it had exploded, with disastrous results to both of them

ABOUT an hour before, one of the miners, after charging his drill hole with dynamite, had tamped it; then lighting the fuse, he and his buddy had climbed down their respective manways to the top headings, there to await the firing of the shot.

Ten minutes passed, then fifteen, and still no shot. They knew that the fuse burned at the rate of about a foot a minute, and calling it a missed hole, they climbed down the gangway and had a "snack" of lunch.

Now a missed hole is caused by several things. Where fuse with a detonating cap is used, there may be a knot in the fuse containing no powder, and when the fire reaches this point it is stopped, or it may ignite the fuse, which will burn slowly, causing a "hang fire." In this latter case the fire finally reaches the train of powder in the fuse and is conveyed back to the detonating cap, thus exploding the charge. Or again the cap may be "dead," and even though the flame does reach it, it fails to explode.

In any event it is not safe to go back to the hole for 24 hours, and then a new hole should be drilled close to the missed hole and fired.

Under no circumstances should the tamping in a missed hole be bored out and the hole fired again.

The safest way, however, is to fire with an electric battery. If this is done and the hole then misses fire, the wires may be disconnected from the battery and the miner may return to the hole in safety.

Old and experienced miners will often employ the most dangerous methods simply because they hope to save some 30 or 40 cents' worth of powder.

The foregoing true story is one of many instances where the powder and time saved are at the expense of a human life. Furthermore, the price of this carelessness was not fully paid by the suffering of one miner and the death of his buddy; the families of both men were compelled to pay an undeserved penalty.

Mr. Miner, is it worth while?

This foreword was suggested by Forney L. Parker, of Joliett, Penn. We wish other readers would contribute brief accounts of real happenings where the price of carelessness has been death and disaster. We will pay from ten to twenty dollars for every story of the kind published on this page. It is only through a knowledge of the mistakes of others that we can hope to eliminate recklessness and inaugurate an era of careful obedience on the part of all those who are engaged in mining.—Editor.

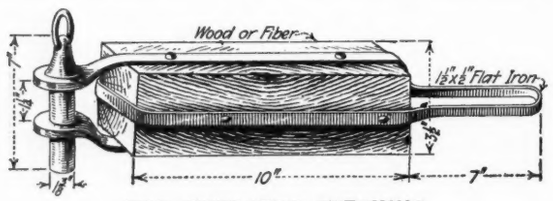
Ideas and Suggestions

An Insulated Car Hitching

By H. Clyde Elkins*

As a safety precaution the Washington Coal and Coke Co. has installed and is now using the insulated wagon hitching, shown in the accompanying illustration, between the electric locomotive and the cars when transporting miners to and from the mine. These hitchings, five of which are in use in the company's mines at Star Junction, Penn., are about 18 in. long over all. They consist of a dry, hard wood, or preferably a fiber block, which is strapped upon two sides with the same grade of iron that is used in ordinary hitchings.

The use of such a hitching effectually prevents the current from the locomotive from traveling back along the



THE INSULATED HITCHING

trip of cars and thus finding its way to the rail. With the ordinary arrangement of cars and locomotive, it is not at all uncommon for the current to find its way back along the trip and thus to the rail, particularly if the rail is heavily sanded. A severe explosion of powder which occurred at Fayette City in January is believed to have been caused by such a stray current. As this hitching is placed immediately behind the locomotive and the wood or fiber forms an effective insulator, it is impossible for the iron of the cars to become energized.

More Random Notes

By Mine Superintendent

The thanks of the progressive mine managers should be given to Messrs. Cornet and Shubart for boosting the rotary dump. It deserves all the praise they gave it and then some. In my opinion it is easily the most efficient dump that can be installed, and I hope I will be able to get one for one of our tipples which is to be remodeled.

Mr. Deloney's paper on the missing mine foremen is distinctly interesting and instructive. I think he has overlooked one point that accounts for a part of the discrepancy—that is, the number of men in the mines who get certificates and then return to their old jobs without making an effort to obtain a foreman's position.

An accident to which my attention was recently called has given me cause for a good deal of thought on the question of moral responsibility. It seems to me that many of us are legally right but morally wrong when we allow men of limited intelligence, even though they be experienced miners, to carry on their persons such deadly things as detonators, or caps as they are usually called.

The victim of the accident was on his way out of the mine and had some No. 7 detonators in his trousers pocket and is believed to have had a stick of coalite in a pocket of his jumper. The detonators were loose in a pocket carbide container made of heavy tin. The top was low and the man was bent over considerably and walking alongside the track. While on his way out an explosion occurred in his pocket, causing injuries from which he died in a few minutes. Upon examination of the body pieces of the can and of the detonators were found deeply driven into the flesh. It is evident that the detonators exploded from some cause, probably the jar of walking, possibly from the change in temperature from the cool mine air to the comparatively warm pocket.

A Case of Carelessness

Our safety inspector caught a case here the other day that was even more reckless. A miner had just checked in and was filling his lamp when the inspector saw something gleaming in the carbide can and upon investigation found a number of detonators mixed with the carbide. The miner, a negro, thought that was a perfectly safe way to carry them, as "they couldn't shake about." One shudders to think of what could easily have happened if a small piece of carbide had worked in against the fulminate and exploded it.

All this leads up to the question of whether we have a right to preach "safety first" and yet allow the possibility of such dangerous methods in dozens of cases of which we can have no knowledge. It is only when accidents occur or when the fact is learned by chance that we know of our continual warnings being neglected. I figure that this danger is avoidable at little or no cost, and I hope some day to try my plan. Briefly, it is to use gang bosses over a group of miners and to have these men keep all the detonators for their section in a safe place. When a shot is needed the boss will see that the hole is properly placed and that the other conditions are right and will then furnish a detonator, supervise the loading of the hole and then shoot it. The miner would furnish the explosive and be charged with the cost of the detonator.

This service should cost not to exceed a cent a ton, and in mines where prepared sizes are made, the improvement in percentage of large coal should more than wipe out the cost. I think that this would be a long step toward safety and efficiency in certain mining sections, and as I know it is not new, I hope that some of the readers of *Coal Age* will give us the benefit of their experience with this or similar schemes.

To jump back to the rotary dump for a moment, I want to ask why so few mines in low and medium seams are taking advantage of this dump in connection with a composite car having a bottom under the axles instead

*Dawson, Penn.

of above. By the use of this simple change a considerable gain in capacity is obtained with the same overall height, the coal is moved in larger units, therefore more efficiently, and in the case of a new mine the cost of the change would be but trifling.

I have been watching for a carefully compiled set of figures giving the comparative cost of gathering coal with the new combination locomotive and with the electric cable type under the same conditions, preferably on the same run. These figures would be interesting and instructive, and I hope they will soon appear in *Coal Age*.

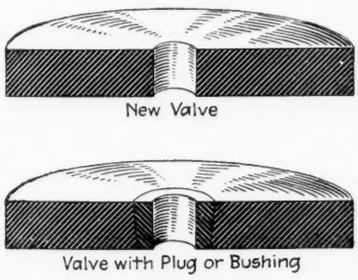
Increasing the Life of Rubber Pump Valves

By Timothy Ryan*

Rubber pump valves for ordinary mine pumps may become a source of considerable trouble as well as expense. Not infrequently the hole through the rubber disk becomes enlarged because of the wear of this part upon the valve stem. Quite frequently a practically new valve, or at least one suitable in every other respect, is cast aside on account of this excessive wear and the enlargement of the stem hole.

To obviate this difficulty a rubber bushing may be inserted in the stem hole. To accomplish this a valve with a large hole is punched so that this hole is somewhat larger still. A bushing or center piece may then be punched from an old valve to fit this enlarged hole. This center piece should, however, be cut a little larger than the hole it is to fit, and after both parts are treated with rubber cement, it may be forced into place.

After the plug has been inserted and cemented in place, a hole may be punched in the center of the blank valve thus formed. When this central hole has again worn too large, the plug may be removed and a new one substituted. By this means valve stems that have worn even to a considerable extent may be kept in service, as it is an easy matter to fit the hole in the valve to the valve stem. Thus if the original size of the valve stem was ¾ in. in diameter, but had become worn down to, say, ⅝ in., it is an easy matter to punch the hole in the valve to ⅝ in., thus making a close fit.



VIEW OF VALVE WITH AND WITHOUT BUSHING

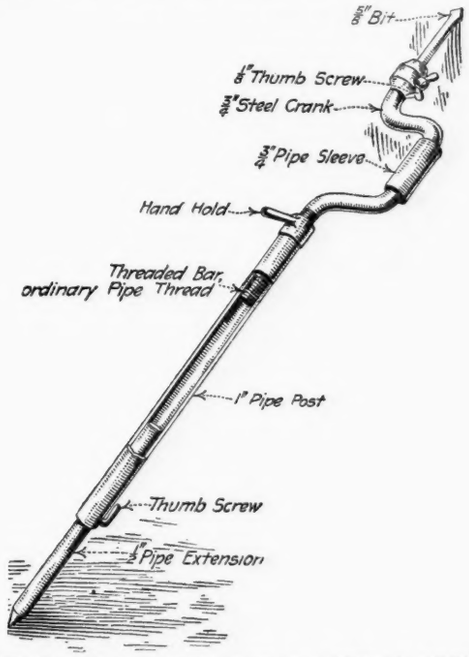
I have used this method of repairing old valves for several months and find that it works with a considerable degree of satisfaction.

A Light Portable Drill

By William Fleming†

The accompanying illustration shows a drill which may be advantageously used for placing sight plugs in rooms and headings. It is also convenient for drilling holes for lights at switches, stations or sidetracks, as well as for putting up wire leading from the trolley to machines or pumps.

This drill weighs about 8 lb. and may be easily carried and operated by one man. It can be adjusted for use in places varying in height from 3 to 6 ft. and will drill even hard rock. This drill can be made in any ordinary mine blacksmith shop at small expense.



DETAILS OF A CHEAP BUT PRACTICAL DRILL

An Idea with a Suggestion

That the Success Number of *Coal Age*, which will be issued Apr. 1, will deal with the most popular, the most interesting and the most important subject connected with mining is the idea. The suggestion is that every *Coal Age* reader help make the Success Number a success. This can be accomplished by a very little effort on the part of many men, and that effort will not be rewarded with a "thank you," but in a more material and substantial way—namely, a check for real dollars.

You will read the Success Number, and some of the articles will help you. Are you going to help the other fellow? Are you going to write a story about a man who has fought a good fight and won—a story that will put heart into a thousand other men who are finding the trail to their goal a rough and discouraging route to travel?

Are you going to tell the true facts concerning the successful outcome of your experiments with a new machine or a new mining method? Are you going to show other fellows how you solved a problem that was yours yesterday and may be theirs today? Ask yourself where you would be right now if you had not the experiences of others to guide you. We must give as well as receive. Being a little busy isn't an airtight, waterproof excuse.

There are many men who are masters of their business, but no one else is aware of that fact. A well-written article is the best kind of self-advertisement and it is just as necessary to advertise brains and experience as it is soap or breakfast food. Many employers never discover the value of their employees until some other fellow wants to hire them.

*336 E. Walnut St., Hazleton, Penn.
†Arcadia, Penn.

Handling High Coal Outputs

By H. Reisser*

SYNOPSIS—Many large and well-equipped mines are prevented from securing a large output by inadequate yard facilities. A proper movement of cars and continuous operation of the tipple go far to insure a large daily tonnage.

Failure to reach large daily outputs in bituminous-coal mining plants is seldom caused by delays in the movement of the coal between the time it is dumped in the tipple for sizing and the time it is charged into the railroad cars for shipment. Screening and coal-preparation plants are usually designed with sufficient capacity to take care of momentary peak loads of 100 per cent. more than the average output for the reason that for short periods of time they are obliged to handle material at this rate.

An inspection of various coal-mining plants would lead one to believe that low capacities can be traced, almost without exception, to shutdowns of the tipple machinery on account of lack of loaded cars at the dump. Plants actually getting a large tonnage are the ones whose tipple machinery is kept continuously supplied with coal and seldom wait for its coming from the mines.

An inspection of a majority of the larger operations in Pennsylvania and West Virginia where the output is not satisfactory from a tonnage standpoint leads me to believe that the trouble is the result of cramped yardage for the manipulation of the loaded and empty trips of cars or of yards so laid out as not to permit the return of the cars with the minimum of handling. This results in serious congestion and hampers the capacity of the operation.

At one operation observed the track layout was such as to make it necessary for the empty trip approaching the portal to cross the tracks provided for bringing loaded trips from the mine to the tipple. It seemed invariably the case that the empty trip was crossing these tracks at a time when the outcoming loaded trip arrived, with the result that the loaded trip would have to come to a stop at a point where there was a slight grade. When the tracks were again clear, it was no easy matter to start the long trip of loaded cars and get them up to speed, without the use of much sand. This condition would naturally be much aggravated in wintertime with frosty rails to contend with.

Frequently the empty cars coming out of the tipple accumulate, and valuable time is lost before they are returned to the working faces. Often places are found where the use of a small mechanical car feeder would tend to keep the coal in motion until the haulage motor could return from the main headings and take away the accumulated empties. Frequently also it is apparent that a few dollars spent in the laying out of additional tracks would save hours of idle time for the entire tipple crew and increase the loading of coal for market.

If large daily outputs are to be obtained it is necessary to have plenty of storage for trips of both loads and empties. The problem resolves itself into the parallel of a large railroad shifting yard on a small scale. Take for instance the yards of a large transfer station, where all the tracks are brought to the peak, or the highest point in elevation. Flying switches are essential, and it is amazing how quickly cars are grouped into their proper trains and in how short a time this may be accomplished. This would be impossible if any congestion existed. The same is true of the handling of a yard system of a mine.

It is customary for a loaded trip to be brought to the tipple by the electric locomotive and for the motor to uncouple from the trip, switch out to a run-around track, and either to push back the standing empty trip or to proceed to the front of it and pull it back into the mine, where the cars are run singly or in pairs to the working rooms.

Where mechanical car feeders are employed, the motor first pushes the trip into the feeders. Since trips at many operations comprise from 50 to 100 cars and modern feeders are designed with almost unlimited capacities so that oncoming loaded trips may be attached to the one being hauled by the feeder, this mechanism takes the place of the motor, allowing it more time in which to haul empties back to the working rooms.

Every minute is especially valuable in the morning, when all the night cars clog up the main headings and the day men are crying for empties to load. This condition can be eliminated quickly if there is sufficient storage capacity out in the yard.

The accompanying illustration gives a detailed outline of what has been installed at one of the largest and most modern mines in western Pennsylvania, and an explanation of this trackage and ground system will convey a clear idea to the reader.

At a point *A* some 1,200 ft. behind the dumping points of the tipple all the loaded cars from the several mine openings are brought to two common loaded tracks. It will be noticed that two crossovers have been provided to take care of emergencies such as car derailments, accidents to machinery in the tipple, etc. For purposes of storage, then, it would be possible to accommodate 250 cars on both tracks, the car length usually being 10 ft. over all.

Electric locomotives bring the loaded trips, varying from 50 to 75 cars, to a point *B*, where they uncouple and switch out directly over the returning empty tracks of the cars coming from the kickbacks in the tipple. The motor track is elevated high enough, however, to allow the empties to pass under it into the pockets at the foot of the empty trip makers, and the locomotive returns by the motor track to a point *C*, where it gets in front of the waiting empty trips made up by the mechanical feeders and returns them to the mine. Crippled cars are taken from the trip at a point *D* and sent for repairs to a point *E*.

By this method supplies for inside the mine are taken from the supply house at a point *F* and sand and oil for the locomotive at a point *G*. The motor barn is situated at a point *H*, easy of access both for housing at quitting time and for repairs.

It will be noticed that the loaded and empty tracks are always clear and that the chances of congestion at any time are remote.

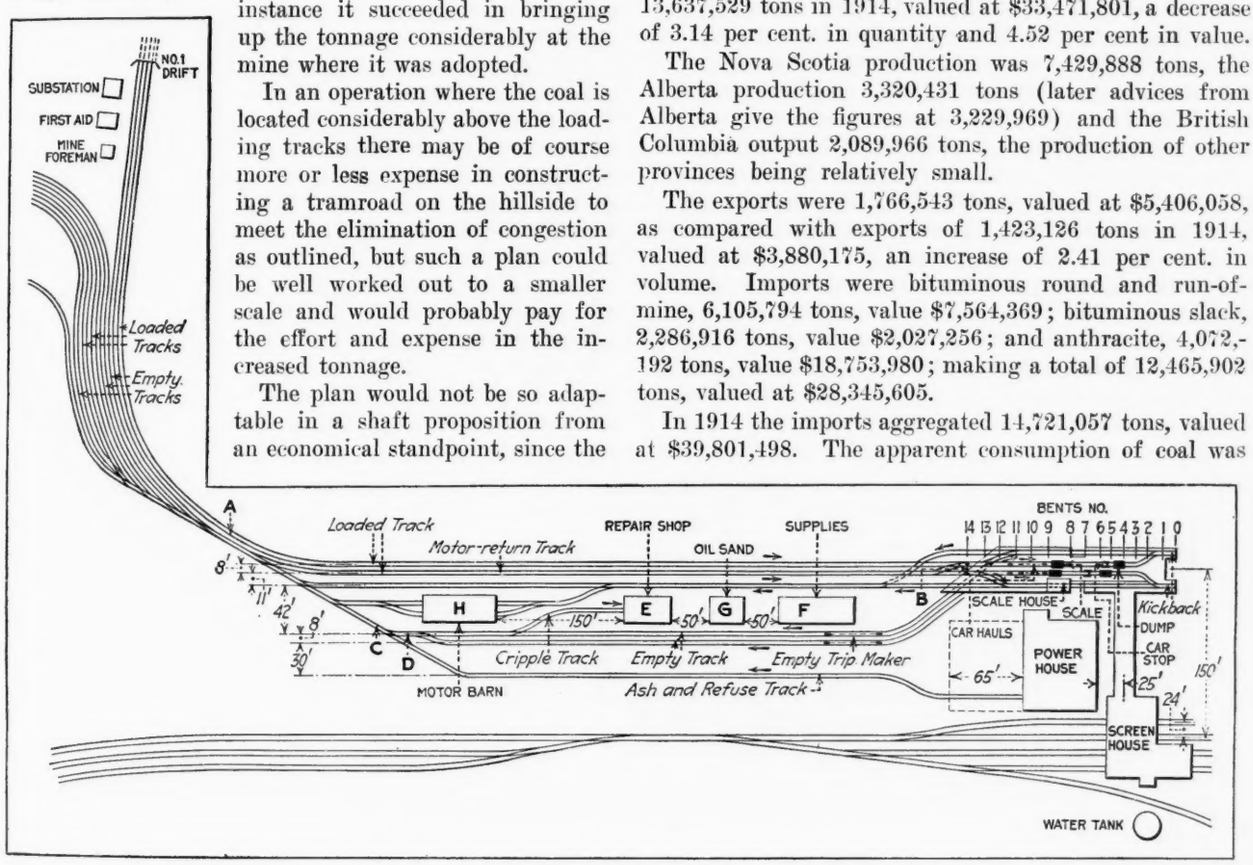
*Chicago, Ill.

There are of course many circumstances which might forbid the scheming out of such an elaborate system as that shown here. The contour of the ground is not always adapted to such a plan. It is, however, money well spent if the various points mentioned are given careful attention in design; and if at all possible, especially when overhead expenses and upkeep run high, it is wise to eliminate every possible source of delay in handling the daily output.

The plan described is of course mainly adaptable to slope and drift mines where plenty of ground between tipple and drift mouth is available. I have, however, seen the same kind of a plan developed in operations where the coal bed lies high above the railroad tracks, this being commonly the case in West Virginia. In this instance it succeeded in bringing up the tonnage considerably at the mine where it was adopted.

In an operation where the coal is located considerably above the loading tracks there may be of course more or less expense in constructing a tramroad on the hillside to meet the elimination of congestion as outlined, but such a plan could be well worked out to a smaller scale and would probably pay for the effort and expense in the increased tonnage.

The plan would not be so adaptable in a shaft proposition from an economical standpoint, since the expense would in some cases forbid the installation, because the roof would require continuous support by concrete or steel walls and two tracks are almost always the limit of span underground. This general scheme has been successfully adopted in Illinois.



TRACK LAYOUT AT A MODERN MINE IN WESTERN PENNSYLVANIA

This is one good reason for believing that the slope and drift operation has a big advantage over the shaft proposition. There have been cases where large capacities have not been realized because of the congestion at the lifting point. These cases have occurred in the Pennsylvania fields, where the use of small mine cars becomes a necessity on account of the low beds of coal.

At the drift and slope mines in such localities this disadvantage is overcome by keeping the dumps going continually and handling six, seven, and even eight cars per minute. It will be seen from this how important it is to keep the trips, both loads and empties, moving and how essential is the elimination of congestion and delays. This can only be accomplished by plenty of yard room, either above or below ground, well planned in advance, so that it will not be affected by continual expansion. A carefully planned layout will quickly pay for itself whether the operation be a slope, drift or shaft mine.

Canada's Coal Production

The preliminary report of the mineral production of Canada during 1915 by John McLeish, of the Canadian Department of Mines, gives the total production of coal at 13,209,371 short tons, valued at $31,957,757, as against 13,637,529 tons in 1914, valued at $33,471,801, a decrease of 3.14 per cent. in quantity and 4.52 per cent in value.

The Nova Scotia production was 7,429,888 tons, the Alberta production 3,320,431 tons (later advices from Alberta give the figures at 3,229,969) and the British Columbia output 2,089,966 tons, the production of other provinces being relatively small.

The exports were 1,766,543 tons, valued at $5,406,058, as compared with exports of 1,423,126 tons in 1914, valued at $3,880,175, an increase of 2.41 per cent. in volume. Imports were bituminous round and run-of-mine, 6,105,794 tons, value $7,564,369; bituminous slack, 2,286,916 tons, value $2,027,256; and anthracite, 4,072,192 tons, value $18,753,980; making a total of 12,465,902 tons, valued at $28,345,605.

In 1914 the imports aggregated 14,721,057 tons, valued at $39,801,498. The apparent consumption of coal was 23,849,040 tons, as against a consumption in 1914 of 26,852,323 tons. Canadian mines contributed 48 per cent. of the domestic consumption.

The total output of oven coke during 1915 was 1,200,766 tons, as compared with 1,015,253 tons in 1914. The total quantity sold or used by the producers was 1,168,921 tons, valued at $4,253,536 in 1915, as against 1,023,860 tons, valued at $3,658,514 in 1914. Byproducts from coke ovens in 1915 included 10,448 tons of ammonium sulphate, 7,365,931 gal. of tar and 4,089,602,000 cu.ft. of gas.

There was also for the first time a production of benzol and associated compounds. The production of trinitrotoluene near the close of the year was reported as 100,000 lb. per week. There were about 1,742 coke ovens in operation at the end of the year, as compared with 797 at the end of 1914.

The Little Brass Check in the Crow's Nest

By E. B. Field

SYNOPSIS—When the miner places his check on the hook of the car he loads he takes the initial step in a great accounting system. This system, which is at once intricate and complete, is carried out almost entirely by the use of adding machines. The mining company has thus substituted mechanical for manual methods of keeping records.

Both conditions and practices in modern mining are undergoing alterations. Even the miner himself has changed. Facetious writers have dubbed the modern coal digger "the gentleman of parts" in the mining world. They say that his work will soon be classed among the clean-collar jobs. True, he still lacks a valet to hand him his shovel and light his meerschaum (Missouri or genuine), but even this condition may be in time overcome.

The changeless mule, survivor among the world's ancient burden bearers, still demonstrates that he is a factor to be reckoned with. The smoky oil lamp and the dreaded firedamp have gone into the limbo of things outgrown, but the long-eared denizen of many climes holds on with characteristic steadfastness.

While the pick, like the mule, cannot be altogether dispensed with on account of difficult locations out of reach of machines, the major portion of modern mining is nevertheless done mechanically, either by electric or pneumatic coal cutters. In the Crow's Nest mine the power is electricity. Whereas in pick mining the miner does both the work of mining and loading into the wagon or mine car, in machine operation the work is divided into four parts—undercutting by the machine operator or cutter, scraping out the bug dust from the kerf by the helper as the cutting proceeds, shooting down the coal by the shotfirer and loading it into cars by the loaders.

It is near the face that the mule plays his part; he distributes and gathers the cars. Here, too, is where the little brass check plays its part. Even before the miner thrusts his shovel into the mass of broken lumps, he reaches down inside the car and hangs a little brass check on a hook. This little disk is the miner's passport to bread and butter. It indicates by its number who loaded the wagon.

Checks Cannot Be Easily Changed

When a check is placed far down in a loaded coal car, it is practically inaccessible to any unscrupulous person who might wish to replace it with one of his own. It is covered with almost a ton of coal. When the tippleman dumps a carload of coal into the screen, he knows who should be paid for loading it; so he does his part in the accounting system by hanging the check which the car contains on a peg with others of that particular miner's checks. At the end of the day that miner's work is figured from the number of checks bearing his work number.

Important as is his rôle in the mining game, the mule's work soon ends. It lasts until the car is hauled from the room where the coal was produced to a feeder track. Here the long-eared friend of the miner is supplanted by an electric locomotive, which hauls the cars in trips to the main haulageway. Here the locomotive in turn is at the end of its journey; a cable does the rest.

KEYSTONE COAL AND COKE COMPANY

DAILY REPORT OF COAL SHIPMENTS

MINE ACCOUNT OF BUFFALO OFFICE

DATE March 16 1915

CONSIGNEE AND DESTINATION	ROUTING	INITIAL	CAR NO.	KIND	TIPPLE WEIGHT	R. R. WEIGHT
Thos E Johnson East York, Pa	PRR	B & O	77482	Scn	106.2	106.3
Same	PRR		75841	Scn	98.7	98.2
Same	PRR	PRR	156782	Scn	106.2	106.3
Same	PRR		154132	Scn	100.7	100.7

ORIGINAL (Actual size 7" x 8")

DUPLICATE

TRIPLICATE (To branch office)

FORM 1. DAILY REPORT MADE OUT WHEN SHIPMENT IS MADE

KEYSTONE COAL AND COKE COMPANY

BUFFALO, N. Y. March 15 1915

SOLD TO John E Smith Co.,

ADDRESS Buffalo, New York. SECTION 1306

SHIPPED TO Thomas E Johnson YOUR ORDER 1460

ADDRESS East York, Pa OUR ORDER 14676

RECAPITULATION

GROSS TONS	NET TONS	AMOUNT	MINE
	102.25		No 2
	105.75		No 3
	107.45		No 1
	98.20		No 6
	411.65	$823.30	

DATE	CAR INITIAL	CAR NUMBER	WEIGHT	
Mar 16	B & O	77482	106.300	
		75841	98.2	
	P.R.R.	156782	106.3	
		154132	100.7	
17	P.L.	762411	106.7	
		525411	108.2	
18	P.Co	158270	97.6	
		782195	98.6	
			823.300	

(Original invoice)

SIZE	TONS	PRICE	F O B ,	AMOUNT
Screen	411.65	$2.00	Mines	$823.30

ALL ACCOUNTS ARE DUE ON THE 15th OF EACH MONTH FOLLOWING SHIPMENT RAILROAD WEIGHTS AT POINT OF SHIPMENT TO GOVERN ALL SETTLEMENTS

(Duplicate)

(Triplicate copy of invoice)

FORM 2. INVOICE TO CUSTOMER. MADE UP IN TRIPLICATE AT BRANCH OFFICE

A mile away on the surface this cable winds upon a drum 10 ft. in diameter which is driven by electricity. It brings from the ground at each trip a long string of cars loaded with coal. At the end of their rail journey the mine cars reach the tipple and their contents are finally deposited into railroad cars on the siding.

Eight hundred miners who work in the Crow's Nest mine, together with their families, live within a stone's throw of the mouth of the mine and form the population of a town of nearly 2,000 people. This is a model little town, popularly known as Crow's Nest, although its correct name is Hempfield. The homes in this hamlet are well kept. The miners earn from $100 to $175 per month, and the popular misconception of the downtrodden, abused, half-fed, poorly clothed miner finds here no foundation whatever in fact. The town has its schoolhouse, amusement hall and auditorium. Every bit of ground and every building except the schoolhouse is owned by the mining company, the Keystone Coal and Coke Co. This company donated the land, and the township built the schoolhouse.

Purchased Power Is Employed

Electricity is used exclusively in the operation of the Crow's Nest mine, and there is not a smokestack about the place. The Keystone company does not even make its own electricity. Coal can be sold, so why burn it? Electric current is as cheap to buy as it is to manufacture; furthermore, purchased energy is less trouble. Consequently the company buys "juice" from an interurban power house near-by.

The Crow's Nest mine is, however, only one of 16 coal mines operated by the Keystone company. All of them, like the Crow's Nest, are in Westmoreland County, Pennsylvania, which with Fayette and Allegheny Counties, produce approximately one-third of the soft coal mined in the United States.

From the standpoint of production the Keystone Coal and Coke Co. is one of the largest of Pennsylvania's bituminous operators. All the mines are under the management of a general superintendent. Under this general superintendent are superintendents in immediate charge of the various plants. Each superintendent's orders are executed through an outside foreman, who has charge of all operations aboveground, and an inside or mine foreman, whose authority includes all the work below the surface.

When a miner places a brass check on a coal car, he puts in motion the accounting system of the Keystone Coal and Coke Co. After the tipple man has counted the checks, the total goes on his tally sheet, which is turned over to the mine office each day. The figures there contained are then credited to the miners on the semimonthly payroll.

After the railroad cars are loaded they are carded to the consignee's destination, and the shipping clerk makes note of the car initials and number and makes up a daily typewritten report in triplicate, the original being forwarded direct to the branch office through which the sale was effected. This original is shown in Form 1. From the sales office the customer is notified of the shipment. The duplicate and triplicate sheets are forwarded to the accounting department in the general office, a different tint of paper being used for each branch sales office. The duplicate copy is retained in the files of the

KEYSTONE COAL AND COKE COMPANY

GREENSBURG, PA. Sept 1 1915.

SOLD TO John E Smith Co

ADDRESS Buffalo, New York SECTION

SHIPPED TO Thos. E Jefferson YOUR ORDER

ADDRESS East York, Pa. OUR ORDER

DATE	CAR NUMBER	WEIGHT	MINE NO	MINE TOTALS
3	134,567	102.4		
	345,235	102.4		
	135,124	103.5		
	130,446	101.2		
	195,124	99.3		
	134,123	102.7		
	134,577	98.7		
	123,124	102.4		
	123,123	102.4	12	915.0 †
4	123,987	120.3		
	665,124	102.6		
	345,124	101.2		
	124,012	112.3		
	123,127	101.2		
	446,137	104.7		
	467,127	104.5		
	945,125	102.3		
	655,128	102.6	7	9813 †
5	123,125	102.4		
	112,156	103.3		
	943,147	104.6		
	956,458	104.2		
	568,156	102.5		
	578,346	103.4		
	145,127	109.7		
	629,026	99.1		
	672,126	104.1		
6	536,235	103.4	13	9325 †
	256,127	104.5		
	534,002	103.6		
	203,126	103.4		
	456,237	99.8		
	254,198	96.9		
	464,346	100.2		
	655,343	100.9		
	432,125	103.3		
	347,235	102.4		
7	454,233	102.1	7	10103 †
	452,125	102.3		
	665,236	104.3		
	323,217	107.6		
	406,216	106.7		
	743,079	107.4		
	615,347	100.4		
	563,329	101.3		
		4,6498 #	12	6321 †

ALL ACCOUNTS ARE DUE ON THE 10TH OF EACH MONTH FOLLOWING SHIPMENT. RAILROAD WEIGHTS AT POINT OF SHIPMENT TO GOVERN ALL SETTLEMENTS.

FORM 3. SHIPMENT RECORD MADE OUT IN DUPLICATE

general office, and the triplicate, after the railroad scale weights which govern all settlements has been inserted, is returned to the mine office for the information of the superintendent.

Details of the Accounting System

Referring again to the duplicate copy of the shipping report, which is shown in Form 2, it will be noticed that from this report the invoices are made up in triplicate. The original and duplicate sheets are forwarded daily to the branch office through which the sale was effected, from which office the original or customer's invoice is mailed to the customer. The duplicate, punched for loose-leaf binding, then becomes a shipping record for the information of the branch office. The triplicate sheet, corresponding in all respects to the duplicate, becomes the shipping record, which is retained in the general office.

The duplicate and triplicate sheets have additional columns to provide for figures which do not appear on the customer's invoice, but are intended to give credit for production to the respective mines from which the shipments were made. As this information is all inserted at the time the invoices are made it gives to the branch office all the data in regard to the shipments through that office which appear on the permanent record of the general office.

The monthly statement of customers' accounts, shown in Form 3, is handled on the same general plan, thus giving the branch office a complete and continuous record, corresponding in all respects with the record on file in the general office.

In making up these reports a 17-column duplex (two-total) adding machine is used. This is so arranged that the keyboard may be divided into sections for printing

dates in one column, car numbers in another and weights in still another. The third division, the one taking care of the weights, is the only one that accumulates or adds.

By virtue of the two-total mechanism the total of each day's weights may be printed on the paper, and incidentally stored up in the machine so that on completion of the invoice a grand total of all the daily weights may be printed instantly.

With new uses for the adding machine being constantly discovered, the Keystone Coal and Coke Co. has gradually been shifting its accounting work over from the manual to the mechanical method. It now has but little work being done in any other way than by machines, most of which are electrically operated.

Extracts from a Superintendent's Diary

Frequently it seems as if I am fated to behold men at their best and men at their worst, and ofttimes the same men appear as examples of both best and worst within very brief intervals of time.

Not long ago we had what promised to be a serious mine fire, and but for the bravery of one of our miners, Tom Logan, would have lost a large part of one of our mines. Not until the fire was completely under control would Tom consent to leave his post, and by that time he had become so weak that he had to be assisted up the slope. As he came out of the pit mouth some of the men standing around started to cheer him, but he silenced them quickly and returned their well-meant applause by taking them to task most unmercifully for their unconcern about their employer's property. "We needed you fellows inside, and you didn't show up," was the way he expressed it. Several weeks later the directors of our company sent him a check for $500 just to show him that they appreciated what he had done. When I presented him with the check, he seemed much surprised, and finally remarked that he had only done his duty and really did not know whether he ought to accept the check.

Later, when some of his friends attempted to congratulate him upon his good fortune, he remarked that if the company ever had another fire, it would become necessary to have a bookkeeper on hand to count the volunteers and keep them in line, so solicitous would everyone become about the company's welfare. His sarcasm had a marked effect upon several of the young bloods who had refused to lend a hand on the day of the fire, and one young man in particular felt the fling so keenly that he left camp.

Today Tom Logan has again come into prominence, but in quite a different manner. He comes before us this time as a plaintiff in a damage suit against our company, said suit having been brought as a complete surprise by one of the most contemptible "shyster" lawyers in the state. "Shyster" lawyers in general have a way of playing strange tricks with company loyalty, and this particular one has played many of them, nor has it ever been possible to anticipate his next move; but it is doubtful if a single resident of our camp could have believed yesterday that Tom Logan would consent to appear in connection with such a man's activities.

Our company years ago adopted a liberal policy in treating with men who had grievances or even fancied that they had grievances, and as a result conscientious attorneys seldom have occasion to resort to suits against us; but the "shysters" look with disfavor upon a plan that requires them to show their hand before entering suit, and in consequence they generally enter suit and then come around to see about the settlement. Now when a lawyer enters suit without first talking the matter over with us, we decide immediately that he is a "shyster" and assume that his case is without merit, and plan a vigorous defense on that basis.

Win or lose, we always lose the plaintiff as an employee; and therein we have felt lies our hope of breaking up the practice, since good men eventually must question whether the suggestion of ill-gotten gains as pictured by the "shysters" can justify them in jeopardizing their standing with our company. But if men like Tom Logan can be led into such treachery, we must have made little progress.

Recent Legal Decisions

Injury Through Derailment of Cars—An employee engaged in loading cars in a mine room did not assume the risk of being injured through derailment of a motor, unless he previously knew of the defective condition which caused the accident and the attending dangers. (Kentucky Court of Appeals, Moore vs. Consolidation Coal Co., 178 Southwestern Reporter, 1136.)

Status of Former Employees Under Illinois Mining Act—A miner who had resigned his employment, but who, with the operator's consent, returned to the mine to obtain his tools, was entitled to the protection of the provisions of the Illinois Mining Act which require inspection of mines, posting of warnings and exclusion of men from dangerous gaseous places. (Illinois Supreme Court, Romani vs. Shoal Creek Coal Co., 111 Northeastern Reporter, 88.)

Injury to Mine Motorman—An operator is liable for injury to one motorman caused by another negligently producing a collision between their respective cars. The injured man is not prevented from recovering on the ground of contributory negligence because he operated his car without lights, if the car was not equipped with them or if existing lighting appliances were so defective that they could not be used. (Kentucky Court of Appeals, King vs. Stearns Coal Co., 181 Southwestern Reporter, 329.)

Breach of Employer's Statutory Duty as Negligence—When it appears that an employee has been injured by cogwheels left unguarded by the employer in violation of statute, the employer can escape liability for damages only by showing that contributory negligence on the part of the employee was the direct cause of the accident. And when a workman is killed under circumstances to which there are no eyewitnesses he is presumed to have exercised ordinary care for his own safety. (Pennsylvania Supreme Court, Maurer vs. Rogers, 95 Atlantic Reporter, 593.)

Valid Combinations Under Sherman Act.—The Sherman Antitrust Act is not violated by the combination through a holding company of a coal mining company and a railroad corporation, unless it appears that unlawful practices are resorted to with a tendency to the restraint of competition in the production of coal. No violation results from the fact that the coal company holds extensive tracts of coal lands in excess of present needs and that that company produces a large percentage of all of a particular kind of coal mined. (United States District Court, Eastern District of Pennsylvania; United States vs. Reading Co.; 226 Reporter, 229.)

Rights Under Leases—When a coal mining lease is ambiguous in its terms, an interpretation acted upon by the parties becomes binding upon them, although the language would have equally permitted another construction. The fact that the administrator of an estate received rental moneys purporting to be in full for rentals due under a coal lease did not prevent the beneficiaries of the estate from claiming a balance actually due, where they had no knowledge of the situation of affairs at the time the payments were made and the lessee was fully advised as to the situation. (Pennsylvania Supreme Court, Tustin vs. Philadelphia & Reading Coal and Iron Co., 95 Atlantic Reporter, 595.)

Coal in the Philippines*

By Wallace E. Pratt†

SYNOPSIS—Although coal is known to exist in all of the larger and several of the smaller of the Islands of the Philippine archipelago, its commercial development has never been a success. This is due to the heavy pitches of the coal beds, to the inferior keeping and stocking qualities of the coal and to a lack of adequate capital.

The history of coal mining in the Philippines is the record of a long succession of failures extending from the early part of the last century to the present time. Yet well-established evidence shows that much coal is present in the islands, that some of it is of good quality, that practically all of it can be used as fuel and that the local market requires a tonnage of distinctly commercial proportions. It is the purpose of this paper to describe the coal resources of the Philippines and to discuss the conditions which have retarded their development.

Coal was first recognized in the Philippine Islands in the year 1827, by engineers of the Spanish government. The original discovery was made on the Island of Cebu, but within a comparatively short term of years the fact was realized that practically every one of the larger islands of the Philippine group contained coal. There have been no important discoveries of coal since the American occupation except within fields the limits of which had been fairly well defined by the Spaniards.

The Spanish government endeavored persistently to develop Philippine coal for use in its navy and for interisland shipping in order to replace the imported Cardiff coal.

Special inducements were offered private capital to engage in coal mining. On several occasions the services of government mining engineers were lent to private companies over extended periods. At one time the ordinary laws were suspended and a liberal concession covering the best-known field was granted to a stock company. In spite of these efforts, however, no coal mining worthy of the name had been accomplished when the Philippines were finally turned over to the United States.

Coal Is Exempt from Wharfage Tax

The Philippine government established by the United States followed Spain in fostering the development of the local coal fields. Coal, with two other products, is exempt from the wharfage tax of $1 per ton which is levied on all other Philippine exports. Domestic coal mining is protected by an import duty of 25c. United States currency per ton on all foreign coal. The United States Army, through Governor-General Taft, created a coal-land reserve, including part of one of the most promising fields, and spent a large sum of money in exploration. A private company which entered the same field, taking advantage of the example and experience of the army engineers, later received the support of the civil government through loans of the services of government engineers, government contracts for a considerable proportion of the output and an advance of capital for the construction of storage bunkers. Yet today, while the imports of coal amount to 500,000 metric tons annually, there is no active coal mine in the Philippine Islands, and the total Philippine production, Spanish and American, has been only 125,000 metric tons.

This condition of affairs is due, I believe, to the following principal causes: 1. The discontinuity of the coal beds as a result of extensive minor faulting and, to a lesser degree, to nonuniform conditions of sedimentation at the time the coal beds were laid down, with consequently restricted lateral extension of the beds. 2. The steep angle at which the beds are commonly tilted. 3. Prevailingly bad roof and floor conditions. 4. The fact that much of the coal cannot be stored because of its liability to spontaneous combustion and to disintegration, or slacking. 5. The inaccessibility of some of the best coal and the generally poorer quality of the coal in the beds which have been least disturbed by dynamism and which are consequently most available to the prospector-miner. 6. The lack of adequate capital. These inhibitive factors will be considered in detail.

TABLE 1. GEOLOGIC SECTION OF PHILIPPINE COAL-BEARING ROCKS, BASED ON EXPOSURES AT ULING, CEBU

Age	Character and Description of Constituent Members	Approximate Thickness in Feet
Pre-Tertiary	Complex of deep-seated, intrusive, effusive and metamorphic rocks.	
Oligocene (?)	Unconformity fine conglomerate and grit derived from Pre-Tertiary complex; fairly well bedded and much indurated.	Varies up to 100
	Coal, nonuniform bed, much squeezed; samples from some outcrops coke.	3
	Conglomerate and grit as above.	Varies up to 100
	Limestone, thoroughly crystalline, blue to yellowish white in color; contains abundant casts of foraminifera, among which Heterostegina margaritatu Schlumberger, a lepidocyclina found in the Oligocene near Dax, France, was identified provisionally by Smith.	100
Miocene	Shale, thin-bedded, with occasional sandstone beds; gray on fresh exposure, weathering to browns and yellows.	1,000
	Coarse sand, or grit, and conglomerate.	100
	Shale and sandstone.	200
	Coal, sub-bituminous.	2
	Shale and sandstone.	50
	Coal, sub-bituminous.	2
	Shale and sandstone.	25
	Coal, sub-bituminous.	2
	Shale parting.	3 in. to 2
	Coal, sub-bituminous.	2
	Shale and sandstone, alternating beds and zones.	1,000
	Coal, sub-bituminous.	5 to 12
	Shale and sandstone, alternating thick beds and zones; a prominent quartz-sandstone or grit near base; base of shale contains Vicarya callosa Jenk., a Miocene fossil.	600
	Coal, sub-bituminous.	3 to 6
	Shale and sandstone, massive.	400
	Limestone, white, crystalline, massively and imperfectly bedded; not everywhere present. Smith has identified Lithothamnium ramosissimum Reuss. and Lepidocyclina insulaenatalis Chap. in this limestone, type Miocene fossils.	Varies up to 500
Pliocene and Pleistocene	Clays and sands containing a varying proportion of volcanic tuff; massively and imperfectly bedded; at places this horizon consists entirely of extremely fine, white tuff; volcanic flows and agglomerates at base; the clays and sands are unconsolidated, but the sands may be cemented with calcium carbonate.	300
	Limestone, yellow, soft and coralliferous; lacking in some sections.	100
	Sandstone, medium-grained and calcareous; regularly bedded; contains tuff.	300
	Limestone, yellow, soft and coralliferous; imperfectly bedded; not always present.	100
	Unconformity.	
Recent	Raised beaches, coral reefs and modern alluvium.	50
	Total maximum thickness.....	6,000

Philippine coal is now generally conceded to be of Miocene age, the earliest deposition having taken place perhaps in the Oligocene. The first Spanish geologists

*Published by permission of the director of the Bureau of Science, Manila.

†Chief, Division of Mines, Bureau of Science, Manila.

in the field hastily concluded that they had to do with true Paleozoic coal. Later, the coal was recognized as Tertiary and was assigned to the Eocene, but the researches of Becker[1] and Smith[2] have now pretty definitely established the positions of the principal beds in the Miocene.

The Miocene series is widely distributed throughout the Philippine Islands, but not all the exposed sections reveal the presence of coal. It appears that conditions of sedimentation were not uniform over the whole area and that coal was not everywhere laid down. It has been noted that where the Miocene beds contain petroleum, as they do in southern Luzon and in Leyte, no coal is found. There is a suggestion that the one class of hydrocarbon is substituted for the other; however this may be, coal is found at one place and petroleum at another in the same series of rocks and in about the same stratigraphic position.

A typical and fairly complete section of the Philippine coal-bearing series is encountered in the Uling coal field, near the town of Naga, Cebu. The Uling section, somewhat generalized, is shown in Table No. 1.

It should be emphasized that the total thickness of the series and the thicknesses of the individual members as described in Table No. 1 are not constant. Some of the coal fields do not show all six of the coal beds. Often the overlying Pliocene and Pleistocene formations are lacking, either having been removed or not having been deposited over the entire Miocene area.

Structure of the Coal Fields

It has already been intimated that the structure of the Philippine coal fields is complex. The Miocene rocks have been tilted and folded very generally over the island group. They have also been faulted, but while the faults are numerous, the throws are not usually great. Locally, the coal-bearing rocks have been thoroughly metamorphosed, both by intrusion and by regional dynamism, but at only one place has coal been found in metamorphosed rocks.

The coal beds are often highly inclined. Complete overturns have been encountered in mining, and beds have been followed up one limb, across the crest, and down the other limb of a sharp anticline. The strike of the beds is fairly constant throughout the archipelago, following the two principal tectonic lines, which trend north-northwest and north-northeast. Severe movement has scattered the beds at places so that the coal comes from the mine in fine sizes only. Such coal, however, owing to incipient metamorphism, is of higher quality than undisturbed portions of the same bed.

Coal has been found on practically all of the larger islands of the archipelago, and in some of them at numerous places. The following list includes the principal known fields:

1. Polillo field (off the eastern coast of central Luzon).
2. Batan field (off the eastern coast of southeastern Luzon); East Batan; West Batan; Gatbo, Sorsogon (on adjacent mainland).
3. Mindoro field (southeastern Mindoro).
4. Masbate field (southeastern Masbate).
5. Cebu field; Compostela-Danao, including Cujumajumayan Valley (north-central Cebu); Uling (south-central Cebu).
6. Mindanao field (western Mindanao).

Polillo lies off the main routes of interisland travel in the Philippines, and while the coal there is of relatively high quality, it has received less attention than the coal in some of the other fields because of its isolation. The suggestion that the natural harbor at Binangonan de Lampon, on the eastern coast of Luzon, near Polillo, be improved and connected by rail with Manila, has been considered at various times. Such a development would enhance the commercial value of the Polillo coal.

PANORAMIC VIEW OF THE EMPLOYEES' VILLAGE ON THE PROPERTY

Outcrops which probably represent four distinct beds of coal have been found on the Anibauan River, near the eastern coast of the island. Two of these beds are considered to be of workable thickness, the thicker bed yielding about 6 ft. of clean coal. The field has been prospected superficially, but no mining has been attempted. The coal is classed from analyses as bituminous to sub-bituminous. The beds are folded along a west-northwest axis, and minor faulting is revealed which makes the correlation of the different outcrops uncertain. At Burdeus, within two miles of the best outcrops, there are natural harbor possibilities.

In the Batan Island field is included the coal at Gatbo, Sorsogon Province, on the adjacent mainland. Batan Island itself has been the scene of the most extensive coal mining undertaken by Americans. At East Batan, a small town near the eastern end of the island, the East Batan Coal Mining Co. operated a small mine from 1908

[1]G. W. Becker, "Report of the Geology of the Philippine Islands," 21st annual report, United States Geological Survey, Washington, 1901.

[2]Warren D. Smith, "Contributions to the Stratigraphy and Fossil Invertebrate Fauna of the Philippine Islands," "Philippine Journal of Science," Sec. A, 8, Manila, 1913.

to 1912 inclusive, exploration having been initiated in 1905. Outcrops of four different beds have been examined in this region, but mining was confined to a single bed about 5 ft. in thickness, with a 1-in. shale parting about 1½ ft. from the roof.

This bed, which lies in the upper portion of the coal-bearing series, proved to be quite uniform in section. The strata are but little disturbed over the eastern half of Batan Island, and the bed mined dips only 15 deg. The coal is a black lignite, and its poor quality was indirectly the cause of the final cessation of mining operations.

Probably 80,000 metric tons of coal was recovered at East Batan. The portal of the main slope was adjacent to a fair natural harbor and only 40 ft. above tidewater. The larger part of the workings were below sea level, although not actually beneath the floor of the sea, since the bed dipped away from the coast. A serviceable mine plant had been accumulated, including a dock with loading tower, steam haulage from mine to dock, wire-rope haulage on the main slope, 4,000-ton storage bunkers, tipple, mine pumps and ventilating fans.

The coal was mined from rooms driven up the dip, the rooms and pillars being of commonly employed dimensions. Generally no powder was used, but the coal was broken down by pick miners, after undercutting. Little trouble was experienced from gas, in spite of the fact that the mine was badly ventilated and the miners carried naked lights. The immediate reasons for closing the mine at East Batan were a mine fire in a part of the workings, caving, and flooding with salt water, presumably from the sea, elsewhere.

OF THE EAST BATAN COAL MINING CO., EAST BATAN, ALBAY, P. I.

The western half of Batan Island constitutes the United States Army reservation, already spoken of. This part of the island has been subjected to folding processes and the coal is sub-bituminous to bituminous in quality, although the same horizon which yields the black lignite at East Batan is represented, and the two fields are only 5 mi. apart. As many as eight beds are revealed in some of the diamond-drill holes put down by the army engineers; the thicknesses range up to 12 ft.

Besides the diamond-drill exploration, which was unsatisfactory because of the broken condition of the beds and the softness of the inclosing rocks, a half-dozen small mines were opened on the reservation. As a rule these openings were abandoned as soon as a fault was encountered. The last work done, however, about the end of the year 1910, passed through a fault zone and into good coal in solid ground before the work was suspended. The portal of this opening was just above sea level, adjacent to a good harbor, at Liguan. Several thousand tons of coal from the army mines were used on the transports with satisfactory results.

The village of Gatbo, in Sorsogon Province, about 20 mi. southwest of Batan Island, was the scene of one of the most famous attempts of the Spaniards to mine Philippine coal. According to the records of the underground work, four different beds were recognized, one of which varies in thickness from 10 to 25 ft. The beds are vertical and the coal appears to be of comparatively high quality, although the one analysis available (see table of analyses) indicates only a fair coal. The Spaniards found the coal to be faulted and squeezed near the surface, but to improve in regularity with depth. Traces of an old tramway, which led from the beach to the principal outcrop, a distance of about a mile, may still be seen. The natural harbor conditions are bad at Gatbo.

A black lignite coal is found on the island of Mindoro, near the town of Bulalacao. Four beds are known to exist, one of which is about 12 ft. thick. The outcrops are about 6 mi. inland, and no attempt at exploitation, or even at thorough prospecting, has been made.

Sub-bituminous coal occurs in eastern Masbate, about 10 mi. inland from a fair natural harbor at Cataingan Bay. The intervening country is of such character that a railway for transportation would not be unusually expensive. Three beds ranging from 3 to 5 ft. in thickness outcrop in either limb of a sharp synclinal fold. The field has been carefully prospected and is believed to be of commercial importance.

Cebu was the center of Spanish coal mining. The Compostela-Danao field includes two former mining districts in north-central Cebu, 6 to 8 mi. inland from the towns of Compostela and Danao, on the eastern coast of the island. The difficultly accessible Cajumajumayan Valley district may be considered as a part of the Danao district, the north end of which it joins. Four coal beds are found in each of these districts, the average thicknesses being about 2 ft., 3 ft., 5 ft. and 7 ft. respectively. In Cajumajumayan Valley one bed attains a thickness of 12 ft. The Compostela coal and most of the Danao coal is bituminous in quality, while the Cajumajumayan coal is sub-bituminous.

The numerous small mines which the Spaniards opened at Danao and Compostela encountered minor faulting and broken ground, so that they were all abandoned before they attained any depth or distance from the surface.

The field was examined in 1907 by two prominent American engineers; 320 acres of coal land in Cajumajumayan Valley was patented at about that time and is presumably controlled by an American corporation. Structurally Cajumajumayan Valley is a syncline and the coal beds are fairly regular.

The Uling Is a Promising Field

The Uling coal field, already mentioned, lies about 8 mi. inland from the town of Naga, Cebu. It was selected by Spanish government engineers late in the Spanish régime as the most promising Philippine coal field. With outcrops which apparently represent six different beds, it contains at least three beds of workable thickness. In 1867 a rock tunnel was begun, which ultimately reached the principal coal bed at a distance of 2,000 ft. from its portal. The records show that in all about 17,000 metric tons of coal was mined in the Uling field. American capital has prospected the field incompletely, but no mining has been attempted since the Spanish time. The best outcrops can be followed for a distance of a mile along the eastern base of Mount Uling, the coal being exposed in the streams but covered in the intervening ridges; at Alpaco, two miles farther south, the same beds are encountered again. The beds strike north-northeast and dip under the mountain to the westward at high angles. Mount Uling takes its name from the native word (*uling*) for coal, or charcoal.

The coal fields of Cebu form a discontinuous belt extending from Alpaco on the south to Cajumajuman on the north. They are in mountainous country and must be approached through the cañons of streams which are liable to frequent overflow, a condition which has discouraged exploitation.

The principal known coal fields in Mindanao are in Moro Province (western Mindanao), about 145 mi. north of the provincial capital, Zamboanga. Two beds, 5 and 8 ft. respectively in thickness, are found on Sibuguey River about 12 mi. inland from Sibuguey Bay. The coal is classed as bituminous.

Near Dumanquilas Bay, in the same general region, outcrops of a semianthracite are known, the exposures revealing a single irregular bed, usually less than 2 ft. in thickness. The character of the coal is attributed to regional metamorphism. No exploitation and but little prospecting have been attempted in Mindanao. The country is not entirely safe for white men on account of the uncertain temper of the Moro inhabitants.

Tonnage of Philippine Coal Fields

F. A. Dalbrug has estimated the tonnage of the several coal fields in the Philippines, basing his calculations on data obtained by various members of the Division of Mines throughout a period of years.[3] He concludes that the presence of 4,201,000 metric tons is demonstrated with reasonable certainty, and that the probable total tonnage of the principal fields is 67,000,000. Of this total about 5,000,000 tons is bituminous coal, 31,000,000 tons is sub-bituminous and 31,000,000 tons is lignite. Table 2 shows tonnages for the several fields.

Reliable data as to underground conditions in the several fields where no development has been attempted are not available, and no general estimate can be exact in the absence of such data. The figures in Table 2 are based therefore upon assumptions so conservative as to make the results an index of the minimum quantity of coal to be expected in each case. Nevertheless, it should be pointed out that a large part of the probable tonnage is attributed to fields concerning which but little is known.

TABLE 2. ESTIMATES OF TONNAGES IN PHILIPPINE COAL FIELDS

Field	Character of Coal	Proven Tonnage (Metric)	Probable Tonnage (Metric)
Polillo	Bituminous	.....	1,331,200
East Batan	Lignite	3,340,000	26,860,000
West Batan	Sub-bituminous	61,000	277,000
Gatbo	Sub-bituminous	.....	154,000
Mindoro	Lignite	.....	4,096,000
Masbate	Sub-bituminous	.....	612,000
Cebu	Sub-bituminous and bituminous	800,000	30,241,600
Mindanao	Bituminous	.....	3,628,000
Total		4,201,000	67,199,800

Quality of Philippine Coal

The Bureau of Science at Manila has performed hundreds of analyses on Philippine coal, and the character of the outcrop coal from the various fields is fairly well known. Practically all the coal, including the lignite, is black with a brilliant luster. The lignites slack rapidly on exposure and are subject to spontaneous combustion in storage. They also disintegrate upon heating, after they have been exposed for a time, and in burning them in ordinary fireboxes there is an important loss through the escape of unburned fines into the ashpit. They can be burned with fair economy, however, on grates of special design, and their fuel value can be utilized with high efficiency in gas producers of proper construction.

Philippine coal is generally low in sulphur and in ash, but is high of course in moisture and in volatile combustible matter. In Table 3 are proximate analyses and calorific values of representative samples from the principal fields. A majority of these analyses represent samples taken in accordance with the specifications of the U. S. Geological Survey. Others, however, were made upon samples which had become more or less air-dried. It will be noted that some of the analyses do not justify the classification of the coal previously given. In such cases, the analysis sample, rather than the classification, is at fault. The analyses were performed by the "smoking off" method recommended by Alvin J. Cox[4] as preferable to the official method for lignite coals. The essential difference in the two methods is in the degree

TABLE 3. PROXIMATE ANALYSES AND CALORIFIC VALUE OF PHILIPPINE COALS (FIGURES EXPRESS PER CENT.)*

Field	Moisture	Vol. Comb. Matter	Fixed Carbon	Ash	Sulphur	B.t.u.
Polillo	8.28	41.35	46.31	3.88	0.32	12,200
E. Batan	18.09	36.24	38.44	7.23	0.84	8,360
W. Batan	5.76	39.64	51.76	2.84	0.18	12,100
Gatbo	13.62	42.93	41.35	2.10	....	9,240
Mindoro	15.34	46.02	32.50	6.14	....	9,800
Masbate	4.87	46.50	44.18	4.45	0.45	....
Uling, Cebu	17.84	34.51	43.03	4.62	....	9,910
Compostela, Cebu	8.60	36.95	51.75	2.70	0.71	11,495
Danao, Cebu	9.01	43.46	43.18	4.35	2.40	11,235
Cajumajumayan, Cebu	13.88	40.87	41.74	3.41	0.65	10,390
Dumanquilas, Mindanao	1.85	10.43	82.34	5.38	0.82	13,845
Sibuguey, Mindanao	6.81	45.45	45.92	1.82	0.43	12,026

* Analyses by the Bureau of Science, Manila.

[3] "Mineral Resources of the Philippine Islands," 1911; Bureau of Science, Manila, 1910, 57.

[4] "Philippine Journal of Science," Bureau of Science, Manila, 1907, 2, 41.

of rapidity with which the volatile combustible matter is driven off. On the whole the tabulated analyses are satisfactory indices of the quality of Philippine coal.

Inquiries have been received by the mining office in Manila as to why coal mining has not become an important Philippine industry, in view of the generally known facts that much coal is found in the islands and that the available market is large. Some of the principal difficulties with which Philippine coal mining contends are enumerated in the introductory part of this paper. Several of these problems deserve further comment.

The lack of continuity in the coal beds has been effective in discouraging thorough exploration. Because of minor faults, especially near the surface, prospectors have repeatedly been forced to abandon work on promising outcrops. A slope is driven down the dip of the bed only to encounter a fault at a distance of from 50 to 100 ft. from the outcrop. Usually the prospector is not competent to decide in which direction he should proceed to recover the coal beyond the fault. Still more often he is dismayed at the cost of the dead work confronting him, even if he is confident of recovering the coal.

Yet my experience has been that the throw of the faults is usually small and that the number of faults decreases rapidly as the exploration proceeds to greater distances from the surface. In the last stages of the work at the United States Army mine, West Batan, the coal had been followed successfully through two faults and the faces had advanced about 200 ft. into good coal in solid, undisturbed ground when mining was finally suspended.

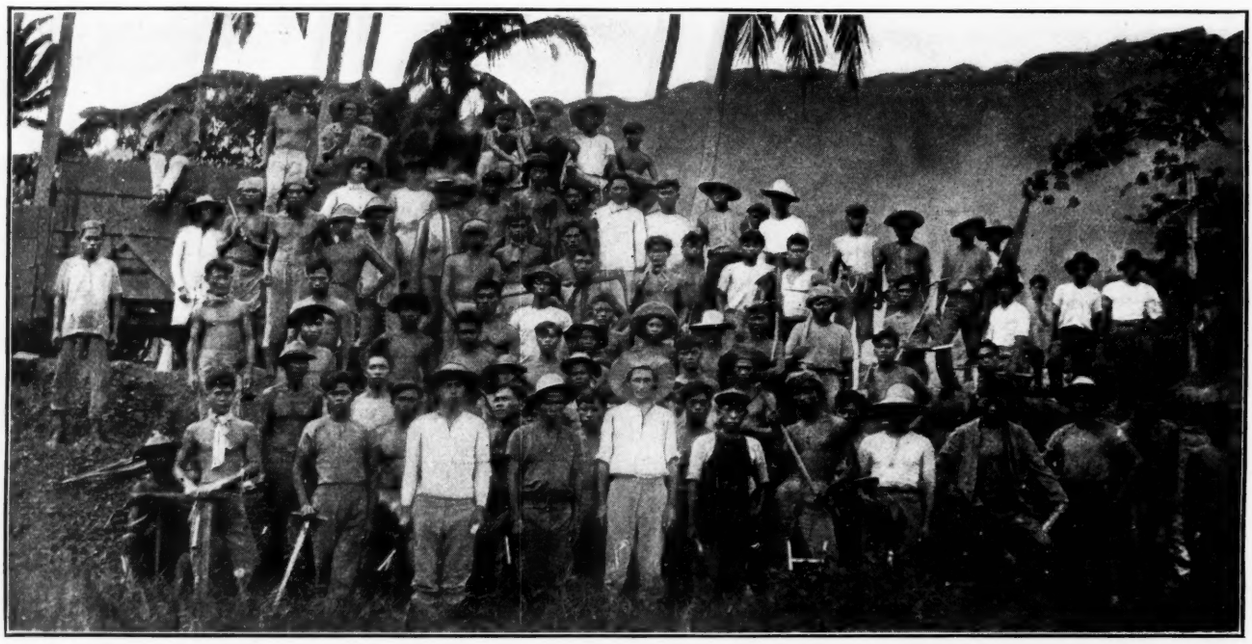
In the Uling field again, where I had an opportunity of supervising the exploration of a bed, the 15-ft. outcrop of which is shown in the accompanying illustration, the work progressed successfully through a faulted zone in which the coal had been displaced a distance of about 100 ft. at right angles to the dip. The coal was recovered beyond the fault; and at a distance of about 500 ft. down the dip from the outcrop, with 300 ft. of cover, the coal was perfectly solid and all evidence of disturbed ground or faulting had disappeared.

A 15-FT. HIGHLY INCLINED OUTCROP OF COAL AT ULING, CEBU
Underground, beyond the fault zone, this coal bed is 8 to 9 ft. thick and undisturbed by faults

The records of former Spanish work bear out the idea that the faulting of the coal is not an insurmountable obstacle. Spanish exploration in the vertical beds of the Gatbo, Sorsogon, district, revealed an improvement in the disturbed condition of the beds at a depth of 100 ft. from the surface. The Spaniards also were able to reach the principal bed in the Uling district at a calculated point beyond the faulted zone, after having driven across the strike of the tilted underlying rocks for a distance of 2,000 ft., an accomplishment which speaks well, for the skill of the engineers in that early day.

Apart from the discontinuity of the beds because of faulting is the question as to whether the beds as originally laid down were persistent and uniform or represented only local deposition over limited areas. It is established that the coal beds are not continuous throughout the entire area of the Philippine Miocene. To a degree therefore the coal deposition was a local occurrence, but whether or not a given bed is too limited in original extent to be important commercially cannot be decided with equal certainty.

The persistence of the beds cannot be inferred from outcrop data. Outcrops appear only in the cañons of streams; on the intervening ridges and slopes they are concealed by talus. Moreover, outcrops are usually so displaced by faulting and surface slides, even where they can be uncovered, as to be difficult of correlation. It is rarely possible therefore to trace the outcrop even though the bed be continuous underground; consequently, it does not necessarily follow that a bed is not persistent because its outcrop cannot be traced.



A GROUP OF FILIPINO COAL MINERS AT THE OLD EAST BATAN MINE

Nonuniformity in the thickness of beds, which might be taken to indicate a tendency toward thinning out, is commonly noted, but in many cases the differences in thickness have proven to be the result of pressure and movement. A bed is thicker on the crest of an anticline and thinner on the limbs of the same fold, for instance. The 15-ft. outcrop in the Uling district actually represents a bed that is only from 8 to 9 ft. thick beyond the fault zone; yet the bed is constant in its thickness, so far as exploration has gone, where the inclosing rocks are undisturbed. It happens that the outcrop reveals a portion of the bed that is thickened, apparently as a result of the faulting. In the case of the East Batan mine the bed was remarkably uniform as far as the working extended—about 1,800 ft. along the slope and 3,500 ft. along the strike.

Only thorough underground exploration, or in favorable situations drilling, can determine whether or not a bed is continuous over a sufficient area to be of value.

In general it may be stated that while Philippine coal beds have been found to be discontinuous by reason of faults, no exploration so far has revealed conditions where a bed of mineable thickness has "pinched out" laterally in undisturbed ground. While faults and possible "pinches" will increase the cost of coal mining in the Philippines, there is little evidence in the work already done that they will prove so serious as to prevent profitable mining.

The steep angle at which the coal beds usually dip is another factor which has retarded development. Since the outcrop relations usually leave him no choice other than to sink on the dip, the prospector has immediately to contend with pumping problems; prospecting is correspondingly expensive. On the other hand, the steep dip has not caused much trouble in actual mining.

The Spaniards employed a sort of "battery" system; they mined from "chimneys" driven upward on the full dip. The miner stood upon broken coal which was drawn off through a chute at the base of the "chimney." At the East Batan mine the main slope was driven at an angle of 45 deg. with the direction of dip, thus lessening the grade; butt entries were turned on either side on the strike of the bed, and the rooms opened up the dip parallel to the main slope. As a matter of fact the dip at East Batan was not steep enough but that the main slope and rooms might have been driven on the full angle of the dip.

The strata in most of the Philippine coal fields are not strongly indurated. Consequently the roof of a coal mine is usually soft and liable to cave; the floor likewise may bulge or creep. These conditions render prospecting difficult and increase the cost of mining. Toward the end of the operation of the East Batan mine it was realized that the upper 1½ ft. of coal, above a shale parting, could be left in place to support the roof with better economy than resulted from taking it out and timbering the overlying shale. While some of the coal fields are in heavily forested country where mine timber is

abundant, other fields are situated in deforested areas and are handicapped by lack of timber. The Philippine hardwoods make good mine timbers, but are hard to work.

Much of the Philippine coal lies at distances of from 5 to 12 mi. from tidewater and still farther from a harbor or shipping point. Railroads to bring the coal to the coast must be built along the walls of narrow cañons, subject to violent floods during the rainy season, or the location must follow a more circuitous route along mountain ridges. Even after the coal has been transported to the coast it is essential, if the fullest benefit of the market is to be obtained, that it be taken to a point where ships touch frequently in the established trade.

Finally, lack of capital has operated more effectively than any other one factor, perhaps, to prevent the development of the Philippine coal fields. Only the prospector or the man of limited means has attempted to mine coal in the past, if exception be made of the inconclusive, because unfinished, venture of the United States Army. If adequate capital were interested in Philippine coal mining, a quantity of coal of commercial importance could be developed, or a given field proven unimportant economically, within a period of months. Most of the difficulties cited would lose their deterring influence in the face of capital; none of them appears to be insurmountable.

Labor Available and the Mining Laws

In conclusion, a word may be devoted to the labor available for coal mining in the Philippines and to the laws which govern coal production there. For common labor and miners the Philippine mine operator must depend upon the Filipino himself. While there are Chinese and Japanese carpenters and artisans in the islands, these people do not constitute a laboring class there. Past experience in both metal and coal mining has demonstrated that the Filipino can be trained to become a satisfactory, if not an expert, miner.

With the beginning of operations in a new district labor is scarce, but in time each mine becomes the center of a colony of native miners who constitute a fairly satisfactory solution of the labor problem. At East Batan, Filipinos developed into skillful pick miners and worked long hours in bad air and in insufferably hot rooms for a wage equivalent to $1 per day.

The coal-land laws of the Philippines are similar to the coal-land laws of the United States. There is no provision for leasing, however; coal lands are sold outright and must be paid for within one year from the date of location or entry. Experience in several cases has proven the period of time (one year) allowed between the location and purchase of coal lands to be inadequate for thorough prospecting and therefore to work a hardship on the locator. The purchase price is equivalent to $10 per acre for coal land situated more than 15 mi. from a railroad, improved harbor or navigable stream, and $20 per acre for coal land within 15 mi. of such means of transportation. One important clause of the law provides that an individual shall not be entitled to purchase more than 160 acres of coal land, and no corporation shall be entitled to purchase more than 320 acres. There is, however, apparently no legal way to prevent two corporations or two individuals, each holding the maximum allowable acreage, from combining under one management.

French Coal Conditions

Special Correspondence

I have just learned from a reliable source that the rise in the price of coal in France has brought about something in the nature of a crisis. Allowing for the difficulties of importing from England, the present exorbitant price of coal in France is unjustified and appears to be due to the action of speculators.

Prices have been progressively raised for some time so as to capture the big manufacturers and rich private residents, who lay in their stocks of coal during the summer. For many months the middlemen have been engaged in gradually storing in their sheds as large a reserve stock of anthracite, coke and wood as possible, and with the continuation of very cold weather they have materially increased their prices.

Of course even in times of peace the production of the French collieries is insufficient for the consumption, and the insufficiency has to be made up from the British and Belgian mines. Many of the Northern French collieries are in the hands of the enemy. The British collieries were for some months obliged to reduce their foreign output considerably owing to the heavy home demands, while the Belgian collieries are altogether closed to the French. Specialists estimate that these circumstances justify an increase of 25 per cent. on normal prices, whereas the actual increase has been in the neighborhood of 50 per cent.

Official statistics show that British collieries are supplying France with about 1,700,000 tons of coal per month, while the French collieries are also producing 1,700,000 tons, making a total of 3,400,000 tons. This, in view of the fact that there are nine departments now in enemy possession that are not supplied from France, should be almost sufficient for current requirements, and there is therefore no real justification for the high prices prevailing.

With a view to preventing a coal famine in Paris it is understood that the Paris municipality and the local government officials bought in England 100,000 tons of coal at prices varying from $4.84 to $5.72 per ton for delivery in December and January. The Paris Gas Co. did even better than that by buying at Newcastle, for delivery up to Oct. 30, 1916, 250,000 tons of coal at prices varying from $4.36 to $4.72 per ton.

Resistivity, a factor depending only on the material or structure of any metal as compared with pure copper as unity, may be expressed in a number of different ways. It may be expressed either in linear dimensions or as a combination of weight and dimension. It may represent the resistance measured between opposite faces of a unit cube of the metal, or the more common method is that of expressing resistivity in terms of ohms per mil-foot, meaning the resistance of a round wire 1 ft. long having a diameter of 1 mil or 0.001 in. and an area of 1 circular mil. For telephone and telegraph conductors, it is customary to use weight per mile-ohm as a unit. This is the weight of a conductor one mile in length which has a resistance of 1 ohm. It equals the product of the resistance per mile and the weight per mile.

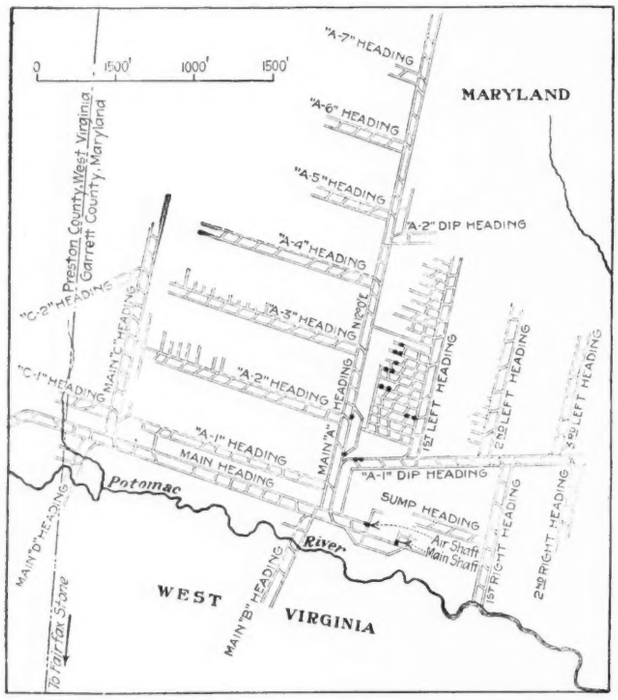
The Success Number of "Coal Age" promises to be the largest and most interesting issue of the paper ever gotten out. If you haven't started preparing an article for this number, commence today. You may describe anything connected with coal mining that is successful, or you may tell about things that have proved unsatisfactory and caused failure. The man who knows the reasons for failure is equipped for success.

Explosion Near Kempton, W. Va.

SYNOPSIS—An explosion of coal dust which arose from a blown-out shot and was limited in scope by the condition of the mine. A man had been using dynamite and placing shots partly on the solid.

At 6.20 a.m., Tuesday, Feb. 29, 1916, shortly after a large proportion of the day-shift miners had entered the mine, dense smoke was discovered rising from the main hoisting or upcast airshaft at the operation known as No. 42 of the Davis Coal and Coke Co. This was the only evidence on the surface that an explosion had occurred within the mine, yet in this disaster 16 men lost their lives.

Kempton is a small mining town on a branch of the Western Maryland Ry. Though it is situated in West Virginia, the mine is in Maryland, the line between the



KEMPTON MINES, SHOWING LOCATION OF DEAD

two running from the Potomac River northward along a line run by George Washington from the celebrated "Fairfax stone" at the headwaters of the same river. A small portion of the mine is actually in West Virginia, for it crosses the Potomac, which is here a mere run of trifling importance, though of well-marked topography. All the men who were killed were in Garrett County, Maryland, and will come under the compensation provisions of that state.

The mine is well laid out, overcasts and regulators being provided to give the required amount of air to each part of the workings. Ventilation is provided by a large Robinson fan capable of producing 150,000 cu.ft. of air per minute against a 3-in. water column. No gas has ever been detected in the mine. The coal is from 4½ to 5½ ft. thick and is located in the Lower Kittanning bed, one of the Lower Productive Coal Measures.

The mine, being situated along the synclinal axis of the upper Potomac basin, is naturally fairly moist. The airshaft is somewhat wet, and the water falling for a considerable distance is practically atomized, thus dampening the air current. At no time has the entering air been moistened by the use of steam. Nevertheless the mine was always so well dampened by natural causes that there is no doubt in the minds of the managers that the zone of the explosion was limited by barriers of wet and moist workings, which lay between the origin of the explosion and the other parts of the mine.

The operation from its start in 1914 was not intended by the management to be a large mine as "large mines" are now rated. The crop line was not far enough distant to make such a purpose feasible. For this reason there are not the multiplicity of paralleling headings such as are found in a mine planned for a great future or such as are driven when the coal is thick. But the mine is well equipped and well planned, and as West Virginia mines go it is likely to be a leading producer. The shaft is 420 ft. deep.

Recovery Rapid, Damage to Mine Being Slight

Immediately after the smoke had shown that an explosion had occurred a party headed by Superintendent George Roberts entered the mine and succeeded in locating the origin of the explosion and the area affected, which proved to be the first left heading turned off the "A-1" dip entry. This heading contained 21 rooms.

From the checking in and out system in effect at all mines of the company it was shown that there were 71 men scattered throughout the mine workings at the time of the accident. It was definitely known shortly afterward that a large proportion of the men were safe and located in other portions of the mine where neither the direct nor the indirect effects of the explosion could harm them.

Certain members of the rescue party were detailed to round up the miners in the unaffected portions of the workings, and many of the men thus warned were unaware that an accident had occurred. Some even loaded their empty cars after the explosion happened. Meanwhile the main portion of the rescue party devoted its attention to restoring the ventilating current throughout that entry in which the explosion had occurred and to which it had been confined.

General Superintendent R. P. Maloney arrived from Thomas, W. Va., about an hour after the accident occurred and took active charge of the rescue parties and of the affairs generally, and under the rapid and efficient system of rescue put into effect the few men in that part of the mine which had been affected by the explosion who were still alive were soon brought to the surface unharmed, with four injured men. One of these expired shortly after being brought to the surface, and a second died Mar. 6, in the Allegany Heights Hospital, Davis, W. Va., where two of the injured men were taken immediately after the accident. The fourth injured man was taken to his home at Kempton, suffering principally from shock.

The dead bodies (numbering 14 and located on the map by dots) were, preparatory to bringing them to the

surface, collected at the bottom of the shaft. All the bodies had been disposed at the lower landing before 2 o'clock. Shortly afterward they were removed to the undertaker's at Thomas, W. Va., to be prepared for burial.

Cause of Accident Was Correctly Diagnosed

Mine Inspector William Walters, of Frostburg, Md., reached the scene of the accident about 5 p.m. and in company with others immediately entered the mine for the purpose of making his preliminary investigation, at which time he found that the origin of the explosion had been at the face of room No. 11 and was caused by a blown-out shot, which had in turn resulted in a secondary dust explosion, which was confined to the workings along the first left entry and which was prevented from spreading farther by the moist condition of these entries.

Further evidence to substantiate the conclusion regarding the blown-out shot was disclosed by the fuse and dynamite caps which were found in the coat of the miner who worked in room No. 11. The universal rule at this mine and the general practice had been to use only permissible explosives and to detonate them with an electric battery, and this miner violated the rules of the company by using short fuses and high explosives.

Dynamite Shot Hole Drilled 12 In. on Solid

William Walters, in his report to the Cumberland *Evening Times*, says that it is clear that the accident resulted from the firing of the shot. He says:

In room No. 11 the working face was being advanced, and the last work done at the face before the explosion was the firing of a shot in the middle of the breast, the hole being against the roof and 12 in. into the solid. From all appearances this was the point of origin. Evidence shows force directed down the room toward its mouth, a large amount of coke and dust being found on the inby side of props and a large quantity of débris being observed in the middle of the road. The track in the innermost crosscut was disconnected by the violence of the blast.

A coat sweater was found about 4 ft. from the face, and in the pockets of this sweater were found four No. 6 detonators and two pieces of fuse 12 in. long. Jacob Zukolich's body was found nearby. It was more severely mutilated than any of the others. He had been working alone in the room. Fortunately there was no crosscut to No. 12 room, the barrier being left solid for the benefit of the drainage. As a result no damage was done from No. 12 to No. 21 rooms, and no one was hurt in that range of workings.

No. 10 room was up its full distance, and the miners were beginning to pull the pillar. Two cars were standing in the crosscut to the left. They were 18 ft. apart, and some coal had been filled into the inby car. The explosion forced in the end of the gates of both cars and deposited coke upon them. The blast evidently went through this crosscut to room No. 9. In room No. 10 two dead men were found.

In room No. 9 much coke was formed on the right side of the props. Moisture was found on the roof near the end of the room. One dead man was discovered here. In room No. 8 there were two cars in the end crosscut on the left. The front end of the inby car was off the track, and there was a coke deposit on the right side of this car and coke on the right side of the props, which latter was more noticeable than in the crosscut from room No. 9 to room No. 8. There was much moisture on the roof of this room. Two bodies were found here also.

In room No. 7 two cars were found, both off the track, with an accumulation of dust on the inby end. There was also a prop at the inby end of a car. This had been knocked out of place, falling outby, and it showed clearly that the explosion traveled to that point from some center of violence farther in the mine.

In room No. 6 coke was deposited on the right side of both props and cars. Two bodies were found at the end of this room. Two cars were standing at the end of room No. 5 when the explosion occurred. Both cars had one end thrown off the track, and a large amount of dust had accumulated on the ends and sides of the cars. The air was still foul at the face when this room was explored. In No. 4 room two more dead bodies were found, and the same number had fallen on main "A" heading, close to the bottom of the shaft.

No damage to the mine was done other than the blowing out of a few stoppings along the first left aircourse and in the heading in which the explosion occurred. Even here the destruction was limited to the length between rooms Nos. 6 and 12.

H. M. Wolflin, chief of the mine-rescue division of the Bureau of Mines, in charge of Rescue Car No. 6, arrived at Kempton at 10 p.m., but found it unnecessary to enter the mine until the following morning, as all the men had been accounted for and the dead bodies removed from the workings. Mr. Wolflin and his staff, with Mine Inspector Walters and the officials of the Davis Coal and Coke Co., made a thorough investigation of the mine Wednesday morning, Mar. 1, at which time the government officials took measurements and made the usual thorough investigation for future report, which has not yet been presented.

No Methane Found Before or After Explosion

The rescue parties and the investigators found no sign of gas whatever in any part of the mine. At no time had methane been detected in the workings. This fact would make it unlikely that the accident arose from the ignition of gas. Only a dozen air stoppings were displaced by the concussion. There were no other evidences of a disturbance to be found at any point in the mine. The fan and hoisting apparatus were unaffected and continued to operate normally throughout the subsequent investigations of the workings.

There was no disturbance during the rescue work, owing perhaps to the fact that only one of the men had a wife and children living at Kempton.

The following is a list of those killed by the explosion, including those who died after being rescued:

Name of Dead Men	Nationality	Marital Condition	Age
Joe Komodina	Austrian	Wife in Austria	40
John Scarpiri	Italian	Single	19
John Componolia	Italian	Single	50
Tom Pollish	Austrian	Wife in Austria	46
Toney Menish	Austrian	Single	19
Edward Scarpiri	Austrian	Single	28
Joe Previsch	Austrian	Wife in Austria	40
Joe Micolich	Austrian	Wife and three children at Kempton	33
Mike Mattish	Austrian	Single	..
Joe Fiaporti	Austrian	Single	28
Yacob Vukolish	Austrian	Wife in Austria	46
Toney Meroney	Austrian	Single	29
Pete Berona	Austrian	Wife in Austria	36
George Marn	Austrian	Not known	22
Joe Liscic	Austrian	Wife in Austria	36
Rudolph Prondie	Austrian	Wife in Austria	33

Inspector Walters posted the following preliminary report regarding the condition of the mine:

After a thorough investigation into the cause of the explosion in this mine and from all evidence found in the part affected where the loss of life was the greatest, it is my conclusion and that of the expert investigators that the trouble was caused by a blown-out shot in room No. 11 on first left off first dip and that there were no noxious or explosive gases present.

Owing to the conditions found in the mine and the favorable reports of Inspector Walters, the miners have quickly returned to their working places, and normal conditions have again been restored.

The Secret of America's Industrial Greatness, according to George Otis Smith, lies principally in the fact that under normal conditions this nation produces 40 per cent. of the world's coal, 66 per cent. of its petroleum, 40 per cent. of its iron, 60 per cent. of its copper and 32 per cent. of its lead and zinc.

New Apparatus and Equipment

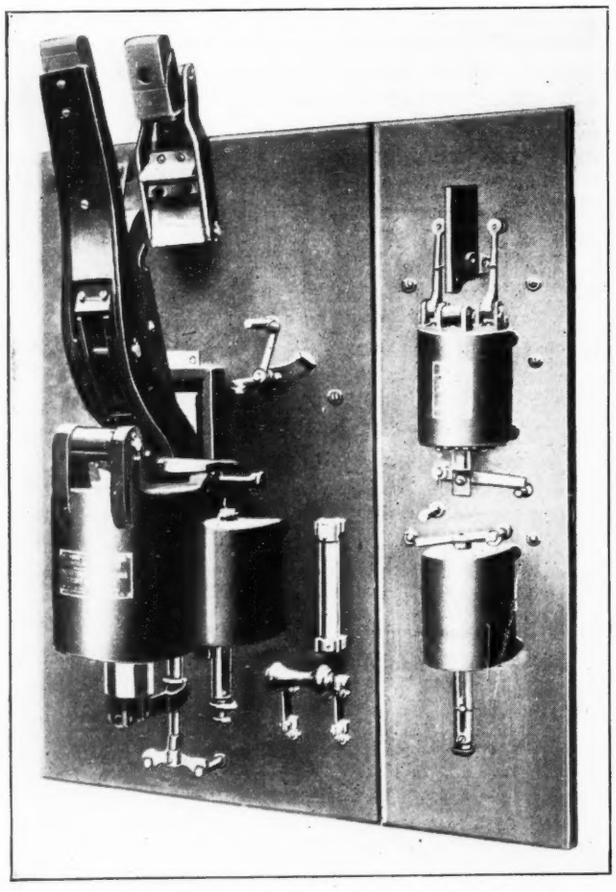
Automatic Reclosing Circuit Breaker Relay

The Automatic Reclosing Circuit Breaker Co., of Columbus, Ohio, has recently developed a new type of relay, styled relay type F2, to operate in conjunction with its automatic reclosing circuit breakers.

The standard form of automatic reclosing circuit breaker is designed to control the entire current imput to the circuit and will not operate satisfactorily in a feeder circuit where such feeder is supplying current to a load circuit which is also supplied by current at other points.

This new feeder-circuit relay is designed especially to operate with circuit breakers connected in a circuit supplying current to a network of distribution lines. The accompanying illustration shows the feeder-circuit relay operating in conjunction with a 1,200-amp. type D automatic reclosing circuit breaker.

The special feature of this relay is that it has a potential adjustment whereby the breaker may be set to reclose at any voltage from 50 per cent. of normal to full voltage on the load side of the breaker.



THE RELAY INSTALLED WITH AN AUTOMATIC RECLOSING CIRCUIT BREAKER

Should the breaker open owing to an excessive load, it will reclose at the expiration of a short interval provided the voltage on the load side of the breaker is not excessively low. Should the voltage be excessively low so that the breaker would immediately open were it to reclose, the potential adjustment may be set so that the breaker will not reclose until the voltage has risen to a safe value; but the instant the voltage does reach the allowable amount the breaker will automatically reclose. Should a short-circuit occur, the breaker will of course remain open until this short-circuit has been removed.

Another feature of this relay is that it enables a breaker to be used on a network where a number of feeders are supplying current to a common load or it may be used on an independent circuit, where breakers control the entire current input to the load. When used in either connection, the breaker will operate entirely automatically and will reclose only when line conditions are right and no short-circuit exists.

The dead-load adjustment is provided with the breaker whereby it will reclose on any predetermined amount of load, such as lights, self-starting motors, etc., but will not reclose on actual short-circuit of low resistance. This combination of feeder-circuit relay and circuit breaker is especially suitable for the protection of rotary converters or motor-generator sets in small substations supplying current to mines, street railways, mills, etc., where the switchboard attendant has other duties to perform than looking after the circuit breaker.

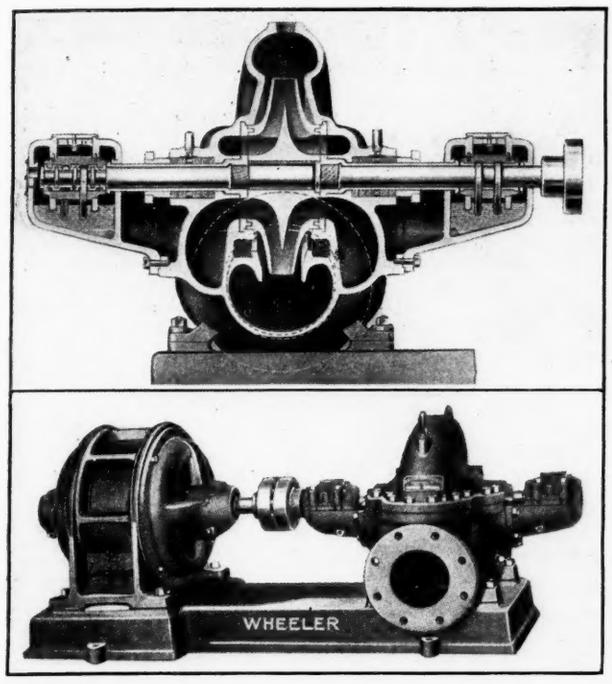
The potential adjustment on the relay furnishes a certain means of having the breaker closed only when proper voltage relations exist between the generator protected and the load circuit. This eliminates the necessity of having a voltmeter or other means of indicating proper voltage so as to enable the operator to know when to close the breaker. It also eliminates the human factor in operating the breaker, thus making the operation more certain to occur at the proper time, with delay and liability to accident.

*

Wheeler Centrifugal Pumps

The Wheeler Condenser and Engineering Co., of Carteret, N. J., is now building a line of horizontal- and vertical-shaft centrifugal pumps for general services, as well as for condenser work. For over 20 years most of the pumps built by this company have been used in connection with condensers. The new line of machines is suited for all services.

A small motor-driven unit for tank or standpipe operation is here illustrated. Referring to the sectional illustration, it will be seen that this pump conforms to the most recent advances in centrifugal pump construction, having a two-part divided casing, with the suction and discharge nozzles in the lower half. The impeller is of the closed double-suction type, protected by labyrinth wearing rings. The shaft is protected from



GENERAL AND SECTIONAL VIEW OF THE NEW PUMP

the water by bronze sleeves, which screw onto the shaft and extend through into the bearing bracket boxes.

Bearings are of the ring-oiled type, and in the outboard bracket there is located a similarly oiled thrust bearing, which is a refinement not usually found in double-suction single-stage pumps. The bearing brackets on these machines are of large size and are bolted to the pump casing, instead of being cast integral with it.

In manufacturing, particular attention is given to the casting of impellers, since the work of the designer in selecting the correct impeller dimensions may be entirely defeated by crude or careless shopwork. These parts are cast in dry sand or skin-dry molds, and the cores are made from a "sand" which is in reality a fine powder, which when properly mixed, weathered and baked into a core gives a surface which the metal takes perfectly. The result is that the finished impeller is a perfect casting, true to pattern.

Case Low-Pressure Oil Forge

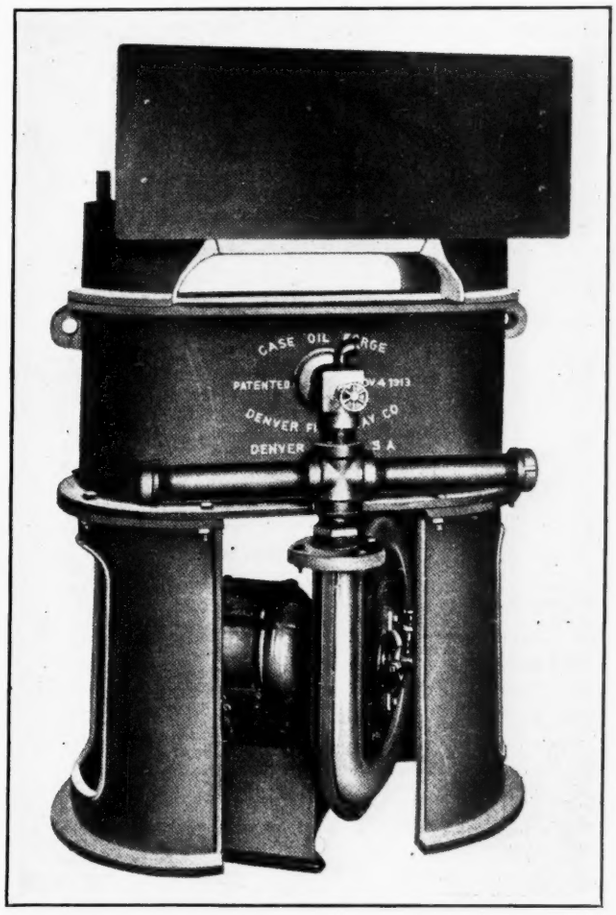
The Denver Fire Clay Co. is manufacturing a type of oil-burning forge that has been given a new application in metal mining and which should similarly prove an efficient innovation in coal mining.

This forge is built as a sort of muffle 3 in. high and either 10 in. or 20 in. long horizontally. It is heated by any low grade of fuel oil that is introduced—with low-pressure air from an electrically driven blower underneath—through a Case burner in front of and below the opening. The shape of the opening is designed to hold drills or puncher bits, and it has a heating capacity, when operated steadily, of nine 1¼-in. steels per minute. The forge is almost noiseless, because the air used is at a pressure of only about 6 oz. and is therefore not in the nature of a blast. The blower or fan requires only about a 1½-hp. motor, which may be of any electrical specification. In a shop using machine sharpeners it will be found that the Case 20-in. forge will keep two sharpeners supplied with heated steels.

There are distinct advantages in the use of oil-burning forges. The steels are not obscured by the fuel as in a coal- or coke-burning forge, and the operator is able to closely observe the temperatures and avoid overheating. Again, there can be no sulphurization. In the forge just described there are additional advantages in the fact that there is such a close regulation of the oil and air that combustion is complete, while there is no excess oxygen present to scale the steel.

One of these forges has been placed in an ordinary mine chamber and unprovided with a flue for the products of combustion, yet the blacksmiths suffer not the slightest inconvenience or injury to health. This is accounted for by the perfect combustion that obviates the generation of carbon monoxide or any smoke. No special ventilation is attempted.

The sharpening of tools underground has effected numerous economies. No time or power is consumed in loading, hoisting and lowering bits, and there is the avoidance of costly surface transportation. Fewer men are required, especially nippers, and hoisting is not interfered with. All these considerations are equally applicable to coal mining, and it would appear to be worth while for coal-mine managers to consider the use of a forge of this kind, unless their mines are known to be dangerous through the presence of gas or dust. There is no danger from fire in the use of this forge, since it is carefully lined with fireclay and the heat is thus closely conserved.



GENERAL VIEW OF THE NEW OIL FORGE

The Labor Situation

SYNOPSIS—Full details regarding the tentative interstate settlement at New York City and the demands of the union at Dubois. Account of the anthracite joint conference at the Union League Club, New York City

Late on Wednesday, Mar. 8, a tentative agreement was adopted by the joint interstate conference of miners and operators at the McAlpin Hotel, New York City. In order to obtain the necessary unanimity it was necessary to have Adolph Germer, of Illinois, the Socialist, withdraw and to permit President White, who had no vote, to cast a ballot on behalf of the Indiana representatives. Some operators were also opposed to an acceptance of the report.

The report of the joint subcommittee as adopted was as follows:

Your scale committee having reached the following agreement, herewith reports the same to this joint meeting of miners and operators and recommends its adoption:

All coal in western Pennsylvania, Ohio, Indiana and Illinois will be weighed and paid for on a mine-run basis.

Pick mine-run coal will be advanced 3c. per ton in the thin vein district of Pennsylvania. In eastern Ohio, the Hocking, Cambridge and Amsterdam-Bergholz districts of Ohio, the pick mine-run rate will be the same as in the thin vein district of western Pennsylvania. In the other districts of Ohio the pick mine-run rate will be advanced 3c. per ton, unless otherwise provided in the joint conference of operators and miners in any of the subdistricts or scale districts within the state. The pick-mining rate in Indiana and Illinois will be advanced 3c. per ton.

The pick-mining rate in the different districts will be as follows: 67.64c. in the thin-vein districts of western Pennsylvania and in the eastern Ohio, Hocking, Cambridge and Amsterdam-Bergholz districts; the rate will be 70.64c. throughout the balance of Ohio, unless a different agreement is made; 64c. in the bituminous districts of Indiana, and 64c. in the Danville district of Illinois.

The price for chain-machine mining mine-run coal will be 50c. in Ohio and in the thin-vein districts of western Pennsylvania, 52c. in Indiana and 54c. in the Danville district of Illinois.

All dead work, yardage and room turning and all day labor will be advanced 5 per cent. with the conditions of the Columbus day-wage scale prevailing. All internal differences are hereby referred to the various districts for settlement, with the understanding that only by mutual consent shall anything be done in district, subdistrict or wage scale conventions that will increase the cost of production or decrease the earning capacity of the men.

All rules now incorporated in existing contracts shall remain in force unless changed by agreement between operators and miners' representatives. The contract shall be for a period of two years, beginning Apr. 1, 1916, and ending Mar. 31, 1918.

A Resolution Pledging Due Care in Mining

Whereas, this interstate joint conference has adopted the determination of the mine-run weight as a standard method for weighing coal, and whereas, it is absolutely necessary to adopt such rules as will safeguard the product of the mines and maintain the marketable condition of the coal, therefore be it resolved, that this interstate joint conference agrees that all district organizations herein represented shall take up the question of preparation of the coal and adopt such rules and regulations with proper penalties as will best suit the condition of each district herein represented.

As a condition precedent to the acceptance by the coal operators of Illinois of the pending interstate joint agreement and in the hope that the introduction of the mining machines into the longwall mines of northern Illinois may enable that field to operate on a basis which shall preserve the miners' earning power and at the same time reduce the operating cost and save the field, it is agreed that a joint commission consisting of three miners and three operators shall be appointed by the two organizations, who shall have power to establish the proper mining rate therefor, without regard to existing machine differentials.

It was announced that the contract would be known as the "McAlpin agreement." It was signed on Thursday, Mar. 9, at 1 p.m.

President White then gave out the following statement:

The miners are highly gratified with the agreement obtained for the bituminous coal fields. The establishment of a universal run-of-mine system of weighing all coal produced marks a new epoch in the affairs of the union and is in fact the happy accomplishment of a 30-yr. campaign by the United Mine Workers of America.

Increases of from 5 to 13 per cent. on tonnage, yardage and day-wage rates measure up to the prosperity of the times and will better equip the many thousands of union miners, who have been anxiously awaiting the outcome of our negotiations, to meet the everclimbing cost of food and of other necessities of life. Peace for two years is now assured, and the readjustments necessary to put the new wage scale in operation will in no way hamper the industry.

The peaceful settlement of the soft-coal wage matters should clearly demonstrate to the American public the need of a strong yet reasonable organization such as the United Mine Workers and the soundness of the basic wage conference plan, by which wage differences affecting 400,000 men have been satisfactorily adjusted without the slightest interference with the industry.

Asked what bearing the bituminous contract would have on the anthracite negotiations, President White said:

None whatever. Comparison of bituminous wages with those of the anthracite workers will prove to the satisfaction of the most careful observer that the hard-coal miners are entitled to a much larger increase, and I feel confident that our wage negotiations will bring anthracite wages up to the level of those in bituminous districts.

There is no reason why a strongly fortified industry like that engaged in the production of anthracite should not grant to its employees every beneficial condition now enjoyed by the miners in the bituminous coal regions, where competition is keen and profits much smaller.

Green Views Pact as Personal Vindication

After the signing, William Green, secretary and treasurer of the United Mine Workers, made the following statement:

After having operated on a mine-run basis, the operators of Ohio have signed a contract agreeing to continue to pay their men by this method of weighing. In addition, the operators of western Pennsylvania, representing a tonnage of about 50,000,000 tons a year, have agreed to do likewise.

I feel highly gratified over this action and regard it as a complete vindication of the fight which I made in the Ohio Legislature for a mine-run law. Notwithstanding the bitter criticism directed toward the law, the action of the coal operators of the central competitive field in agreeing to a mine-run basis will disprove the argument that such action destroys the coal industry.

The author of the Ohio mine-run law, the action of the legislature which passed it, the commission which commended such a law and Governor Cox, who signed it, have all been vindicated by the present mine-run agreement signed by the operators and miners of western Pennsylvania, Ohio, Indiana and Illinois.

Some of the operators who were in the city during the conferences said that the price of soft coal would advance about 10c. a ton as a result of the new agreement, while others estimated an advance of 25c. a ton. The majority seemed to think that the total cost to the operators will aggregate about $15,000,000.

Du Bois Convention Discusses Indiana Mines

Last week this department discussed the Dubois convention, reaching the resolution on Mar. 1 whereby that body voted to put three organizers in charge of the Indiana organization work at the mines affiliated with the Buffalo, Rochester & Pittsburgh R.R. This was done at the suggestion of President Purcell, who thought it better to have that change in management made than to engage a number of men to make an investigation; for the inquiry could only reveal what was known already—namely, that the success of the union in Indiana was not in proportion to the efforts it had put forth. Purcell's own wish was that if the organizers were appointed they should be free lances subject to the authority neither of the executive board nor of the president of the district, and by vote of the convention, on Mar. 2, it was so ordered. However, in the afternoon the president's supporters gained strength and offered a resolution to reconsider their decision, and as a result the president was reinstated in his control over the Indiana field.

A resolution had been offered indorsing the Socialist party, and the resolutions committee urged nonconcurrence. The matter was warmly debated. Frank Waite diplomatically offered an amendment to the effect that the members of the organization vote only for candidates who represent the best interests of labor. Brophy had previously made a similar amendment in which the word "candidates" replaced the expression "parties." The majority seemed agreed that this was objectionable, as it might be taken to refer to the Socialist party. The report of the resolutions committee was passed with the Waite amendment. The committee favored the anti-preparedness resolution, and it was passed by a large majority.

Resolutions urging that "the convention demand of Congress that the mines be owned and operated by the government" and also that the district officers test the constitutionality of the attitude of the sealer of weights and measures were referred to the legislative committee. The miners think that the sealers should test the tipple scales.

Leech Recalls a Defunct Condition in Ohio

On Mar. 3 James D. Leech, of Ebensburg, one of the board of liability insurance commissioners of Pennsylvania, delivered what appears to be much the same speech as he rendered before the Coal Mining Institute of America at its December banquet. He stated that in Ohio in the three years previous to the enactment of a compensation law, corporations had paid insurance companies $28,000,000 to protect themselves against liability losses. Of this, $8,000,000 only

was received by the employees injured or their relatives when the men were killed. The other $20,000,000 was used to hire attorneys to fight the cases and to pay dividends to the stockholders of the insurance companies. The address is to be printed with the discussion and circulated throughout the district in English, Italian, Slavish, Polish and Lithuanian.

Both the resolutions committee and the convention nonconcurred in the proposal to give the secretary-treasurer charge of a wholesale co-operative store to be conducted at the district headquarters. The secretary himself declared that several retail stores should be started before a warehouse and that he thought such institutions should be in charge not of a miner but of a merchant, as lack of experience had been the cause of many failures in the past. Another resolution to authorize a state convention in which districts Nos. 1, 5, 7 and 9 would be represented and at which a labor party would be organized met with defeat, both in the resolutions committee and in the convention.

Centralization Plans Begin and End in Talk

For nearly two whole days the convention had discussed the centralization issue and had come to no conclusion. The protracted talk had cost the union $2,800, but on Mar. 4 it was suddenly ended by a motion to lay the resolution on the table. That many were tired of the purposeless wrangling was shown by the vote of 102 to 22. The convention in all probability could not have restored the old subdistrict system had it so wished, as a referendum would have been necessary before such a constitutional change was made. So it was generally thought that the discussion was unnecessary.

On Mar. 6 the constitution committee recommended the tabling of a resolution which advocated that payment of dues be made after a strike of two weeks. Hitherto the rule has been to delay such payments till four weeks have passed, and the convention decided with the constitution committee that a change was not desirable.

An excellent resolution was passed providing that $50 should be paid to the mother of any member on his death if she had been supported by his wages. Another resolution provided that all sick or injured should be kept in good standing in the union at its expense if exonerations were applied for at any time within three months. This resolution was accepted.

The committee favored an 8-hr. day law, and a vote was registered for such legislation. The Cambria County courts were censured for their injunction decisions in the Colver and Nanty Glo cases, and the legislative committee was asked to urge legislation against the issuance of injunctions in labor disputes. The control of the district president was clinched by a resolution empowering him to employ and direct organizers. The convention also resolved that the practice of lending money to locals for the building of union halls be discontinued.

Scale Committee Awaited Action in New York

The long discussions in the early part of the convention did little or no harm, because that body had to wait for the decision of the scale committee, which was itself delayed by the slow action of the committees of miners and operators in New York. The conclusion of that conference on Mar. 8, or perhaps the earlier partial settlements in sub-scale committee on Mar. 6, made easier the formulating of a scale by the miners at Du Bois. On Mar. 7 they adjourned early to await the report of the scale committee.

Legislative Program in Central Pennsylvania

The legislative committee laid down the following program for legislation: (1) Compensation act to be made compulsory on every one. Carried. (2) Compensation act to provide 66⅔ per cent. of wage of injured person in place of 50 per cent. Carried. (3) Compensation act to provide state insurance and forbid casualty companies from furnishing the protection and all operating companies from insuring themselves. Carried. (4) Compensation act to provide life benefits in case of permanent injury instead of payments for 500 weeks as at present. Carried. (5) Occupational diseases to be added to the operation of the compensation act. Carried. (6) Compensation to be amended so as to pay benefits from date of accident. Carried. (7) The committee recommended that district officers require companies to furnish shotfirers. This provision seems to be out of order. Carried. (8) Law to be passed to safeguard miners against dumping inexperienced men from all parts of Europe into the mines of Pennsylvania, thus endangering the lives of those working with them. Law should compel all miners to have certificates. Carried. (9) Law to forbid the use of machines on pillars and stumps. (10) Law which requires that wash houses be provided, to be amended to require wash houses with all accessories. Carried. (11) An old-age pension law to be passed, making the age limit 50 years and providing that anyone permanently crippled shall come under the law. Carried.

A New Wage Scale for Central Pennsylvania

The scale committee reported on Mar. 8, though its demands appear to have been formulated earlier and are dated Mar. 6. They are as follows: (1) Complete and full recognition of the United Mine Workers of America, with unlimited checkoff. (2) An increase of 3c. per ton on tonnage rates at the basing point. (Pick mining net ton to be the basing rate.) A differential of 3c. on coal 3 ft. 6 in. thick and 5c. on coal 3 ft. thick or under. (3) An adjustment of the machine differential based on the present rate of 50c. per ton net for cutting, scraping and loading. (4) An increase of 5 per cent. on all day-wage rates based on the rates paid under the interstate joint agreements. (5) A uniform day-wage scale for all classes of inside and outside day labor. (6) An 8-hr. working day "from bank to bank." (7) A holiday every other Saturday. (8) Weekly pays. (9) An increase of 5 per cent. on all yardage and dead-work rates, but where paid by the hour the scale rate is to be 37.27c. per hour. (10) All cars to be delivered to and removed from the miner's working face. (11) All differentials in tonnage and yardage rates existing under the 1914 scale to continue in force during the life of the proposed agreement. (12) The discontinuance of the use of coal-cutting machines in pillars and stumps. (13) Pay for all narrow work. (14) All local inequalities and internal differences to be referred to the local union for adjustment. (15) The checkweighman and district executive board to have the right to test scales. (16) The abolition of the permanent board of arbitration. All disputes arising under this scale agreement to be determined by joint action of the two organizations. (17) Blacksmithing deductions, company doctor's charges and the rates of house rent and coal to be determined by the joint scale committee. 18 Contract to be in force for two years.

Work-During-Negotiation Rule Is Modified

The scale committee adds in substance: The recommendation of International President White, which was adopted by the international convention and is recommended by District President Purcell in his report, urges that we continue at work after the present agreement pending negotiations. We therefore submit the following proposal:

Pending negotiations we will continue at work after the present agreement has expired, provided that before the date of expiration the scale committee of the operators has met the scale committee of the miners and agreed to the first clause of our demand. In the event that they do not meet prior to the expiration of the agreement or do not agree to clause 1 of our demands, the scale committee shall be vested with discretionary power to order a suspension of work.

If all our demands are not accepted by the operators and any changes are made in this original proposition, and if, in the judgment of the scale committee, such changes are worthy of consideration, they shall sign the agreement tentatively and submit it to the rank and file for a referendum vote. If the scale committee's signature is not ratified by the referendum vote, they are empowered to discontinue negotiations and order a suspension. If a suspension of work is ordered, the scale committee shall submit a recommendation of settlement and policy to the rank and file for a referendum vote.

Explanatory Note Removes Any Uncertainties

In an explanatory note the committee stated that the general tonnage rates should be: Pick mining per gross ton, 75.36c.; pick mining per net ton, 67.29c. The general machine rates should be based upon a differential of 14.29c. per net ton, so that the basic price for cutting, scraping and loading should be 53c. per net ton. The price for loading after puncher machines should be 39.75c. per net ton, and the rate for cutting and scraping should be 13.25c. per net ton, making a total of 53c. The rate for cutting, scraping and loading per gross ton should be 59.36c., out of which 44.52c. should be paid for loading and 14.84c. for cutting and scraping. When electric chain-cutting machines are used that are "bottom cutters," the rate should be 53c. per net ton, but the loading rate should be 42.93c. and the cutting and scraping rate 10.07c.

When the figures are based on the gross ton, the rate should be 59.36c. as for other machines, but the loading rate should be 48.0816c. and the cutting and scraping rate 11.2784c. The rates for puncher machines are to be divided so as to award 75 per cent. to loaders and 25 per cent. to the cutters and scrapers, while with electric chain machines that are bottom cutters the division shall be 81 per cent. for loading and 19 per cent. for cutting and scraping.

The tonnage prices for cutting and scraping, both with puncher machines and electric chain machines (bottom cutters), shall be divided equally between the cutter and the

scraper. The differential is based on the present price of 42c. for loading and 14c. for cutting and scraping, which is the present rate with puncher machines where the weight is measured by the gross ton.

Contract Dead Work To Be Locally Assessed

Narrow work shall be divided into five classes: 1. Places less than 10 ft. wide; (2) places from 10 to 12 ft. wide; (3) places from 12 to 14 ft. wide; (4) places from 16 to 18 ft. wide; and (5) all places driven as entries or back entries, and these must not exceed 18 ft. in width. The pay for all narrow work shall be termed "a local inequality" and shall be referred to the "local union for adjustment." The basing point for narrow-work yardage other than entry or back-entry rates shall be the price paid per yard in back entries. When no yardage rates are in existence in entries and back entries, it shall be a matter of local settlement.

Dead work, such as lifting bottom and taking down top in all places where no yardage is now paid, shall be referred to the local union for adjustment. The standard weight on mine cars and the prices for rolls, spars and clay veins shall be similarly determined. Where the miner is required to lay road to extend old rooms or to withdraw pillars, or is compelled to bail water, timber bad places, clean up falls of roof, lay curves in pillar work or shooflies, he shall be paid at the rate of 37.27c. per hour for every hour so consumed.

Scale Demanded for the Day-Wage Workers

The rates for boss trackmen shall be 40c. per hour, for motor runners and rope-trip riders shall be 38.85c. per hour and for trappers 30c. per hour. All other classes of inside day labor not specified in this agreement shall be paid 37.27c. per hour.

The outside day-labor scale shall be as follows: Engineers, electricians and machinists, 40c. per hour, blacksmiths, 38.85c. per hour and firemen, plane runners, carpenters and repair men, 35c. per hour. All other outside day labor not specified in this agreement shall be paid 30c. per hour.

Whenever a dispute arises as to the meaning of any clause under the agreement to be made, the matter shall be taken up for adjustment first by the mine committee and the local management. If they fail to agree, the matter shall be referred to the district board members and the local superintendent. Should they not agree, the matter shall be referred to the representatives of the joint executive board of the two organizations, who shall settle the matter within five days.

Not Hope But Harm Lay at the Bottom

At the end of the explanatory notes, clause 1 is amplified, and in this further note is seen the reason why its acceptance is made a condition precedent for working pending negotiations. The clause as explained is a menace to American institutions, a violation of the Constitution of the United States and an offense to the liberty of the individual. What body is this which a man must "join or go hungry"? What right has the United Mine Workers of America to say that every man shall pay tribute to it? Who is free while such a right is arrogated by this or any other like secret society?

As clause 1 is interpreted it means that "it shall be a condition of employment that all men working in and around the mines shall be members of the United Mine Workers of America, and all companies signing this agreement shall collect from their employees all dues, fines, assessments and initiation fees levied by the different branches of the organization, and these organization taxes shall have preference over all other collections and be turned over to the authorized agent of the United Mine Workers of America.

A more arrogant trust than this could not well be conceived, and it is to be hoped that the genius of the international officers who did not permit anything so reactionary to appear in the interstate contract will put the weight of their disapproval on its appearance in the agreement demanded by this minor body. The anthracite operators are right in their surmise that the closed shop is in contemplation and not merely recognition or even the checkoff.

On Mar. 10 the convention adjourned at 10 a.m. It will be noted that the scale committee may recommend a suspension at any time. The usual clause requiring them only to call a suspension when it appears that an agreement is not obtainable is omitted, though its omission may be due to an oversight. Many of the miners desired a suspension on Apr. 1 if a full contract was not signed before that date.

Anthracite Wage Conference Reassembles

After seven adjournments taken to enable the scale committee of bituminous coal operators and miners to complete their wage negotiations, the subcommittee of anthracite coal operators and miners began their wage-scale conference at the Union League Club, Fifth Ave. and 39th St., on Mar. 9. Alvin Markle, of G. B. Markle & Co., is the chairman of the committee, and James A. Gorman, secretary of the Board of Conciliation, is the secretary.

The first session was given up to a discussion of Demand No. 2, which calls for an increase of 20 per cent. on all the wage rates now being paid in the anthracite field.

While no lengthy statement was given out by the operators regarding the discussion, it was learned that the miners' representatives, fortified by the statistics of the Federal Labor Department, made a strong argument for the demand, urging that the cost of food and clothing had increased 20 to 54 per cent. since 1902 and stating that the wages of those employed increased only 5.6 per cent.

At the conclusion of the session on Friday, Mar. 10, this statement was issued, as covering the day's proceedings:

The request of the miners embraced in their second demand covering an increase in wages again occupied the attention of the committee.

The representatives of the miners claimed that the increase in the cost of living was a serious problem for the men and that the purchasing power of the miners' earnings was less than in the past. The miners' representatives submitted statistics computed from data furnished by business men of the anthracite region purporting to show increases in rents and in necessities of life.

The representatives of the operators argued that the income of the miners has kept pace with the increased cost of living and that the earnings of the anthracite mine workers compared favorably with those of other classes of labor doing work of a similar kind. Demand No. 3 covering the request for an 8-hr. day for the anthracite region also received consideration.

It was said at the conclusion of the day's conference that no demands would be granted until all of them had been considered and that the real fight would come when the demand for recognition of the union is under consideration.

Eight-Hour Day Clause Carefully Discussed

That Demand No. 3, asking for an 8-hr. day, was under consideration again on Saturday, Mar. 11, was learned when this statement was issued at the conclusion of the day's session:

The subcommittee of anthracite operators and miners resumed their session at the Union League Club at 10 a.m., and continued their discussion of the demands presented by the anthracite mine workers. Demand No. 3, concerning the request for an 8-hr. day, was again before the committee.

Messrs. White, Dempsey, Matthews and Kennedy occupied a large portion of the session in presenting the views of the mine workers upon this subject and strongly urged the granting of this particular demand, while the representatives of the operators discussed the matter as viewed from the standpoint of the operating companies.

The session on Tuesday, Mar. 14, was devoted to discussion on Demands 3, 5 and 6, as set forth in the following statement issued after adjournment:

Demand No. 3 of the mine workers, covering the request for an 8-hr. day, was again before the committee. The miners' representatives submitted a definition of that day as applied to the anthracite fields. A long discussion followed in which the miners contended that the granting of this concession would work no hardship on the anthracite coal industry nor interfere with production. The representatives of the operators argued that the granting of this demand would place a large burden upon the industry with no compensating advantages. This demand was laid over for further consideration.

Demand No. 5, wherein the mine workers request a simplified, speedy and satisfactory method of adjusting disputes, was considered. The miners' representatives complained of the delay incident to the present system of adjusting disputes and urged a plan whereby it may be avoided. The matter was laid over to secure additional data and information as to the workings of the present system.

The committee discussed Demand No. 6, in which the mine workers request that no contract miner shall be permitted to have more than one working place. President Dempsey, of District No. 1, and President Matthews, of District No. 9, informed the committee that the system which permits the contracting of a number of working places to one miner was a source of much complaint in their districts and worked hardship and injustice to the large number of contract miners. This demand was under consideration at the time of adjournment.

Closing Discussions in Anthracite Session

The longest discussion of the days' session was devoted to the demand for an 8-hr. day. The miners held that, if granted, it would not increase the cost of production, and submitted statistics to prove their contention that it had not done so in the bituminous regions and that it was a money saver for the operators.

Previous to going into session the operators held a conference at their headquarters in the Hotel Seville. They considered the demand for an 8-hr. day and also that calling for a 20-per cent. increase in wages. It was said that if both demands were granted it would really mean an increase in wages for the mine workers of 31.1 per cent.

The committee adjourned on Mar. 15 until Mar. 20, in order that the officers of the union might attend a meeting of the United Mine Workers policy committee which convened at Pittsburgh, Penn., on the following day, Mar. 16.

Editorials

Ideals in Wage-Scale Changes

The operators in various parts of the country are endeavoring to sell in one another's territory. To compass that end they try every little while to secure changes in relative wage and modifications of freight rates. The man who pays a high freight or a high wage continually hopes that the matter will be adjusted and he will be enabled to make a raid on his neighbor's territory.

There are some cases where the situation in a given operating region is and has been so unfavorable that the producers at normal times cannot work their mines. In such cases a rectification of wages or freight rates is in order, but generally the number of plants working is enough to supply the territory available to them, and any change in the conditions of operation will cause more plants to open in the favored operating region to supply enlarged selling territory and compel plants to close down in the near-by region because of reduced vending opportunities.

As a result, for every new mine in the region favorably affected, one is closed down in a competing locality. This kind of a readjustment is not advisable. Every attempt to put wages on a dead level is a mistake and to be regretted, not only by the operators who have to pay the increase, but by the men who receive it; for it will result in idleness, if not at once, at least at a later period.

The miners are of the opinion, however, that as business is prosperous this is the right time to make a leveling of wage rates. A better time could of course not be chosen. Such fortunate conditions do at least veil from the eyes of the operators the probable ultimate misfortunes of that region which has to submit to the larger increase and a new method of weighing coal. The operators whose wage rates are raised 1c. to 6c. may well find the areas open to their competition considerably reduced.

A long-established wage differential, just or unjust, works little permanent injustice. Time and nature heal scars. A new readjustment, however, seemingly just, destroys as much or more than it creates. It is far better to keep the differentials unchanged as far as possible. Uniformity once established is of course desirable, especially because it makes the coöperative bargain a simple matter to be understood and quite easy for nonunion sections to copy.

They naturally ask now: What is the change in rate the nonunion districts should concede, seeing that the rates of change are different everywhere throughout the union area? Is it 5.39c. with Pittsburgh, or 3.5c. with the chain-machine rate in Indiana, or 3c. with Ohio, the Danville, Ill., and the southern Illinois districts? There is the rub. The demand on the nonunion territory should be made perfectly clear. It should be just so much per ton.

And because the nonunion districts mostly pay for neither dead work nor yardage, it is better that these items should not be increased in union regions. The burden will fall solely on those who have signed a scale with the union. It is far better to put a larger increase on the ton than to add anything to dead work, for the tonnage increase in the new contract may be duplicated in nonunion districts, whereas the dead-work wage rise cannot be. Moreover, every increase in such dead work makes the attempt to mine with due conservation less possible.

The demand for a 5-per cent. increase in day wages is a mistake, because it is a percentage and is not based plainly on the hour basis. The rise should be rated as 1½c. or 2c. per hour. This is an increase which could be imitated by nonunion sections without difficulty, but a percentage increase varies with the wage paid and hurts most severely the operators which require of their men the shortest day.

It is a misfortune that the machine-rate differential is apparently about to be readjusted to the disadvantage of the machine, and also that the machines of larger output may be weighed down in Indiana with a scale only 2c. per ton better than machines of smaller capacity. It seems to justify the suspicion that the union wants to return to the old-fashioned methods. "No machines at all," seems to be the cry, "and if machines must be used, give us those which have the smaller capacity." Surely the miners are not justified in taking such a reactionary stand.

However, one cannot refrain from expressing pleasure at the fact that Ohio will profit by western Pennsylvania's losses, for indeed it needs assistance. Another source of gratulation is to be found in the courtesy existing between miners and operators and the rapidity with which it appears an agreement may be reached. Criticism of the miners' demands may be made with propriety, but their demeanor during the present disagreement has been almost beyond criticism.

An Argument from Insurance

It used to be customary to insure a property for what it was worth. The argument for so doing was not unreasonable. The man who lost his goods needed to get them back undiminished after a fire; in fact, as they were depreciated property and he might have to buy new to replace them, he would need to receive more than he actually lost if he would be able to do business as before. Moreover, if his business was normally profitable he needed something to recompense him for idleness, and if it was bad he needed a certain flushness of purse so as to prevent his creditors from being apprehensive and crowding him to the wall.

But the insurance company now coldly says, "No," when the merchant seeks 100-per cent. insurance. He must coinsure 20 per cent.; that is, he must be ready to foot the cost of one-fifth of his losses, so that he will have an obvious and unquestionable interest in preventing a conflagration at his property, and he must meet unaided also all the costs of replacing a depreciated by a new property, the cost of idleness and the importunities of

creditors. It seems hard, but it restrains careless or malicious men, and so is justifiable.

In every deal there must be an incentive to both parties to help each other, or there will be no efficiency and rates will have to be made higher to the consumer than they would otherwise need to be. Everyone tends to be indifferent to losses in which he does not immediately share, whether they be fire losses or liability losses or the losses in retailing due to the unnecessary pawing over of goods or to the abuse of the return privilege.

When men are paid by the ton only, the interest of the operator is not keenly aroused by the needs of the miner. It does not worry him if cars are few and their delivery uncertain. In like manner when men are paid by the hour only, they care but little how much work is done per day, and so they tend to loaf on the job.

Similarly if liability insurance should provide 100-per cent. compensation for every idle day resulting from injury, it may not multiply accidents, but it will make the injured less desirous to return to work. Every health and accident insurance company inquires the applicant's wage or salary and insures only a part of it. It does not let the whole insurance rise above a certain percentage of weekly earnings. It seeks to protect both the insurer and the company by giving both some burden to bear. The composite day and ton wage if at some future time it is adopted will have the same object and will effect the same result. It will make both miner and mine operator combine in the raising of the miner's earnings and in increasing efficiency.

A Scrap Without Winners

There is an element of the ridiculous in the present anthracite wage controversy. The miners and operators are disputing where there is little call for discussion and not advancing the issue which they have most seriously at heart. Oftentimes the reason why success is denied is because those who seek it are not quite clear as to what it is they really desire.

One cannot perhaps blame the operators for urging that the miner is able to earn 36 per cent. more than in 1902. But still if the employee is to be paid more money out of the public purse, why urge that he is getting all that he needs and deserves? Surely the public is not going to be made willing to dig deeper into its pockets by telling it that the miner is already much better off than he was several years back. If the miner does not get a better wage, there is going to be a deadlock; and if the operator proves satisfactorily that the miner does not deserve an increase, the public will the more certainly come to the conclusion that it is wrong to give it to him and that if the operator concedes it he must pay it.

It is to be hoped that the operator will not prove his point. This is not the time to lay stress on the fact that the miner is fairly prosperous. The right word for the hour is one which will show that the public generally has been given an increase in wage and that a public so benefited should be willing to pay more to the miner. It is the appropriate occasion to point out that the cost of living is just now on the rise and that the rise is almost sure to continue.

The logic of the situation calls for an increase in the miner's wage. He is not starving, he is not impoverished, his situation is not desperate, but nevertheless he may have some rights to an increase. Must a man prove himself a pauper to get his wages raised?

There is no advantage in proving to the public that the miner with thrift can live a comfortable life with a fair assurance against a shortage of funds in his old age. The argument to be successful should show that the miner has right and title to move along with the procession. Whenever the steel worker, brassworker, machinist and others go forward and the miner does not, then without any movement on his part the latter travels to the rear of the industrial line. This is the real argument. Any other will land the operator in a quarrel with the miner and in a deadlock with the union.

And the miner is still more maladroit than the operator. He tells the public that all the miner wants can come out of profits. He knows well enough that if the public believes him there will be no rise in the price of coal and there will be a deadlock in the conferences. If the miner wants any part of his 20 per cent., he will do well to inform the public that it must come from a rise in price.

Perhaps, the miner does not know this, and so it will be well to quote J. P. White. When he was touring the anthracite towns he quoted repeatedly the dividends of one of the more fortunate companies in the anthracite region—the Delaware, Lackawanna & Western Railroad Co. He declared that the company was making 33c. per day profit off each man in its employ and that 19c. of this would furnish a reasonable return. So the profit which he regarded as excessive amounted to 14c. per day per man. If 14c. per day will pay a 20-per cent. increase in wage, the wage per man can only be 70c. per day.

Now J. P. White admits that the worst-paid adults are getting $600 and over per annum, or about $2.50 per day. A 20-per cent. increase on $2.50 is 50c. per day, and the 14c. which this fortunate company is said to make above a reasonable return will not pay the increase, nor will the 33c. which White tells us is the whole profit. So it will be seen that White's arguments do not tally.

If by chicane he could make out an apparently good case, the specious argument could only undo him, because the operators, finding the public hostile and knowing that a profit could not be obtained if the miners' demands were satisfied, would deny the miner any increase and a deadlock would result. If wiser counsels do not prevail, we foresee a scrap without winners, which of course is no new form of conflict. Most of such controversies cost both parties more than any victory resulting can ever be made to yield.

In conclusion therefore we hope that the operator will fail when he tries to prove the wage of the miner perfectly satisfactory, and we trust the miner will be unsuccessful when he essays to show that the anthracite operators can pay an increase out of profits. Bad luck to both their arguments! There is evidence already that the operators feel that their contention is inconsistent with the granting of an increase while such an advance in wage is the only way of avoiding a strike and the only solution with which the operators would feel completely satisfied. No one can doubt that Morris Williams, of the Susquehanna Coal Co., is anxious to bring back the bacon to his boys at Nanticoke and elsewhere, and the others among the operators' conferees are just as desirous of seeing the matter ended in a manner pleasing to the miners and fair to the public.

Discussion by Readers

Accident in Electric Blasting

Letter No. 3—My attention was drawn to the account given in *Coal Age*, Jan. 29, p. 221, of an accident in electric blasting, in which the hope is expressed that this important subject will be thoroughly discussed.

As the United States Bureau of Mines has had considerable experience along the line of the inquiry made, I am submitting the following comments after conference with the bureau's explosives chemists and engineers.

Experience and experiment have both shown that it is possible for electric detonators to misfire if a number of them are connected in series and an attempt is made to fire them by means of a battery. This may occur even when the electric detonators are of low tension and when tested before use by means of a galvanometer. The galvanometer is used to show whether or not the circuit is closed or open, and if it is closed it may indicate whether or not there is a short-circuit. As all commercial electric detonators now sold in the United States are low tension, one need give consideration only to this general class of electric detonators. Again, as most firing batteries used in this country are designed only for series firing, it is presumed that the electric detonators in this instance were not connected in parallel.

When connected in series, low-tension detonators may misfire by reason of the inadequacy of the current to fire all of them, and this may result (1) if the battery is of or operated at a low capacity, (2) if the joints between the adjacent electric detonator or detonators and the lead wire are not properly made, (3) if one or more of the electric detonators is short-circuited, (4) if the lead wires are unusually long or of an unusually small gage, or (5) from a combination of two or more of these causes.

It is worthy of note that this particular shaft was 450 ft. deep and wet, and that the shots were fired at the bottom by a battery on the surface.

The battery may be tested by means of a special-testing rheostat, which can be procured from the manufacturers of explosives. This rheostat is used to replace all but one of the electric detonators in the testing circuit. Therefore if it fires the one detonator through the rheostat resistance equivalent to that of the electric detonators that it replaces, the battery may properly be assumed to be of adequate capacity. In making such a test the same lead wires should be used as were used in the blast that caused the accident. Should the battery prove of adequate capacity, then the waterproof qualities of the electric detonators should be investigated. If the electric detonators were not waterproofed, it is possible that either the current leaked through the ordinary insulation of the wires or that water leaked through the filling of the electric detonator, thus wetting the top of the detonating charge, in either event causing a misfire. Again, if one electric detonator was short-circuited or not connected up, it would certainly misfire.

While all of these reasons may account for a misfire, none of them can account for the firing of the charge several minutes after the remainder of the round had been fired and after the lead wires had been disconnected from the battery. This can be accounted for by supposing that, a number of the holes in the round having exploded, the highly heated gases from one or more of these holes pressing through the newly made crevices may have set fire to the explosive in the hole that missed, and that this explosive burned slowly until it reached the electric detonator, which on exploding caused the remainder of the charge to explode after men descended the shaft.

There is still another possibility suggested by one of the bureau's engineers—the unexploded stick of dynamite may have lain among the broken pieces of rock, and when the returning shaft sinkers disturbed the broken rock the dynamite cartridge was exploded with fatal results. In fact, if water was present and ordinary dynamite was employed, the tendency of the water would be to cause the nitroglycerin to exude and form a film upon the rock surface which could be readily exploded by friction or percussion through contact with another rock surface, or with nails in the shoes of the "sinkers," even though the rock coated with nitroglycerin was under water.

GEO. S. RICE,
Chief Mining Engineer.

Washington, D. C.

Letter No. 4—Having read with interest the numerous letters in regard to electric blasting in coal mining and the different opinions expressed as to the cause of misfires, I want to give a little of my own experience along this line when I was at Harrisburg, Penn., in 1914. I was foreman for the T. L. Eyre Co., which had contracted for the sinking of shafts and driving of tunnels for the Cumberland Valley Railroad Co. extending from Second St. to the river. I had charge of the center shaft, in which we encountered rock at a depth of about 15 ft.

Having drilled three holes, I started to charge the holes myself, without depending on anyone else to do this work for me. I was more particular than usual and, after examining the battery carefully, told the electrician that I was not satisfied with it. He told me to connect up the wires and he would overhaul the battery.

As nearly as I can remember there were 2,000 volts given by this battery. After all was ready the shots were fired, and we supposed the three holes had exploded. I found, however, on descending the shaft that the center hole had not been fired. The assistant superintendent on the work asked me to explain to him how it was that the center one of the three shots misfired. I could give him no reason, but decided to try the same exploder and dynamite, which I had drawn from the hole contrary to the law and my best judgment. When firing the next hole I did this and the shot exploded, doing good work.

After an experience of twenty years in electric blasting, I can say this is the only accident of the kind that has occurred in the work in my charge. I believe the cause of such accidents is due to the exploders not being carefully examined by the makers.

MINER.

Carbondale, Penn.

Handling Explosives in Mines

Letter No. 5—I have been much interested in the several letters appearing in *Coal Age* on the subject of handling explosives in mines. Five years ago when I was working in the State of West Virginia we used black powder and squibs for shooting the coal, and I can recall several accidents resulting from carelessness in the handling of the powder. I believe the law in West Virginia limits the amount of powder that a miner may take into the mine to the amount that he may reasonably expect to use in one shift. All powder must be taken into the mine in metal canisters of a capacity not exceeding 5 lb.

The problem of handling black powder in the mine does not present itself to us here in the northern part of New Mexico. I have not seen black powder used in the mines for more than five years. We use only permissibles and have found them to be much more satisfactory than black powder for several reasons. There is practically no danger from sparks igniting the permissible powder. Practically the only way in which permissible powder can be exploded is by the use of detonators, provided reasonable care is taken in handling it. Permissible powder is much easier to handle. We do have some trouble from the powder freezing, but do not have any serious difficulty. We have constructed thawers at convenient places so that the sticks may be thawed out when frozen.

The construction of our thawers may be of interest. We use a box of convenient size, say 2x4 ft. and 1 ft. deep. Around the inside of the box and near the bottom are placed a number of sockets for electric lights. A tray with latticed bottom is placed in the box and suspended about 5 or 6 in. from the top. A hinged lid is placed on the box, and a number of holes are bored in the box near the top for ventilation. The powder to be thawed is placed in the tray and the box is closed. We have got very good results by the use of this device.

We have a brick magazine for the storage of explosives located at a suitable distance from the mine entrance, and the knuckleman is the only person who has access to the place. Powder is issued to the miners by the knuckleman on orders from the main office, at certain hours appointed for that purpose, and not more than 10 sticks are allowed one man at one time. Fuse is issued in the same way. The miners are not allowed to have detonators in their possession at any time.

The coal is undercut, and no hole is allowed to be drilled deeper than the cut. Shooting off the solid is not permitted. The miner drills his holes and leaves the amount of powder he deems necessary to use in each hole at a convenient place, to be obtained by the shotfirer on his rounds. The shotfirer inspects, loads and shoots all holes, using his own judgment as to the amount of powder to be used in any hole, and also as to the advisability of shooting any particular hole. The mining law of this state protects the shotfirer by making it a misdemeanor for anyone to interfere with him in the discharge of his duty.

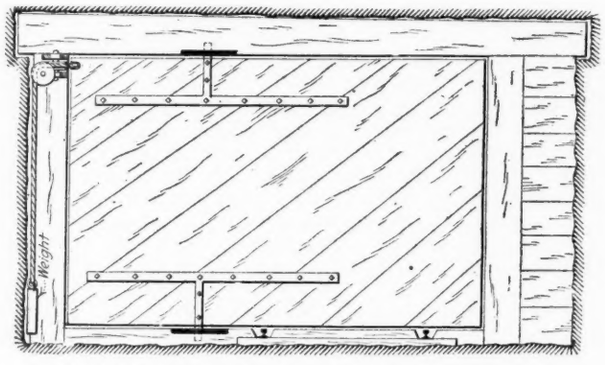
I understand that some of the larger mines in this district have installed systems for firing all shots electrically, after everyone has left the mine. Even when the companies go to extra expense to install such a system there are some men who will jeopardize their lives and those of their fellows by trying to shoot when they please. It was in a mine in this district where shots were fired electrically that more than two hundred men were killed by an explosion two years ago when a miner fired a solid shot in his place by attaching the wires of his detonator to the electric service wires used for power in the mine.

Yankee, N. M. H. L. HANDLEY.

Double-Acting, Self-Closing Mine Trapdoor

Letter No. 2—In reply to the inquiry of Ostel Bullock, *Coal Age,* Feb. 19, p. 349, who asks for the suggestion of a practical method of constructing a mine trapdoor that can be opened by a mule in either direction and yet will withstand the force of the air current, permit me to submit a scheme that I have used and which I believe will suit his purpose.

The door, as shown in the accompanying figure, is swung on two bolts made of 1½-in. round iron, instead



BALANCED, DOUBLE-ACTING MINE TRAPDOOR

of being hung on hinges in the usual manner. These bolts are secured to the upper and lower edges of the door, a short distance from its rear edge, so that there is a partial counterbalance of air pressure acting on the smaller end of the door. Where the air pressure is not great, this partial counterbalance is sufficient to keep the door closed; but with greater air pressures there must be a weight, attached to a short chain or cable the other end of which is made fast to the door.

When this plan is adopted, it is necessary to make a frame having two horizontal pulleys placed side by side and operating in connection with a vertical pulley between them, as shown in the figure. This arrangement is necessary so that the weight will be operated properly whichever way the door is made to swing. The weight must be sufficient to overcome the unbalanced force of the air pressure on the longer end of the door. The collar is set in hitches cut in the coal in both ribs.

JAMES CUMMINGS, Mine Foreman,
Reynoldsville, W. Va. Hutchinson Coal Co.

Letter No. 3—Any ordinary mine door can be made to swing both ways if hung rightly with the old-fashioned gate or barn-door hinge. It can be made to close by fastening a rope to the top corner of the door farthest from the hinges and passing it between two horizontal pulleys set closely enough together to prevent it from getting out of place. The rope must then be passed over a

vertical pulley set just behind the two horizontal pulleys and in the plane of the door. From this pulley it passes over a second vertical pulley set parallel to the rib or at right angles to the first pulley. To the end of this rope is secured a heavy sliding weight adjusted to run or slide up and down an inclined way, which is constructed along the rib.

As the swing of an 8-ft. door is about 12 ft., the slideway should be at least 13 ft. long to enable the weight to rest wholly on the slide when the door is closed.

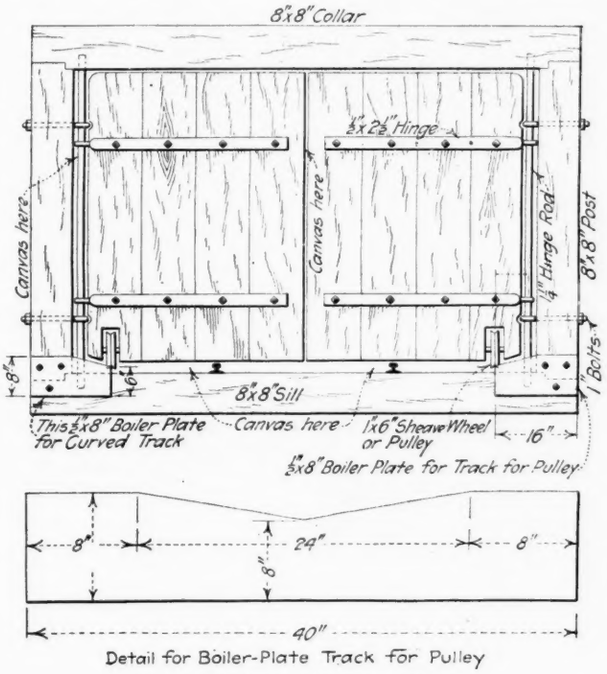
The slideway should be set as steep as possible. The arrangement is simple of construction and can be made and set in place by any mine carpenter or blacksmith.

Bolivar, Penn. W. H. CLARK.

Letter No. 4—Replying to the inquiry asking for a feasible method of hanging a trapdoor, which appeared in *Coal Age*, Feb. 19, p. 349, I would recommend the use of a double door, which is much easier for the mule to push open.

As shown in the accompanying figure, the two half-doors are each hung on a 1¼-in. vertical iron rod by means of heavy strap hinges. The vertical rods are supported in a substantial timber frame set in the entry. This frame consists of an 8x8-in. collar, a sill of the same size and two side posts.

The figure practically explains itself, but it is well to observe that the weight of each door rests on a small 1x6-in. sheave or roller secured in the lower edge of the door. The track for this roller is a piece of ½-in.



SELF-CLOSING DOUBLE DOORS

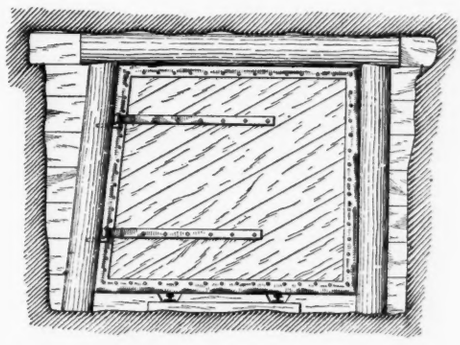
boiler plate set on edge and bent into a semicircle. The upper edge of the plate is cut to a slight curve so as to form two inclined planes on which the roller travels. The plate is dapped into the sill and securely bolted to the post in such a manner that it forms a circular track around the hinge-rod as a center.

The effect of this arrangement is to cause the door to rise slightly on the rod when swung in either direction. The door closes of its own weight. It is necessary to trim both edges of the collar so that it will not interfere with the rising of the door as it is opened. Also, the strap hinges supporting the door must fit nicely on the iron rods, and the latter must be straight so that the doors will swing freely to and fro. C. G. TOLER.

Acmar, Ala.

Letter No. 5—In regard to a double-acting, self-closing mine door that can be opened by a mule passing either way, let me describe one that I have used for some time past and which will remain closed against the air, but which can be opened easily by a mule.

This door is made the same as any other mine door, except that it is hung so as to swing clear within the door frame, which is constructed of heavy timbers set solid in the entry, as shown in the accompanying sketch.



A SELF-CLOSING, DOUBLE-ACTING DOOR

Also, the post on which the door is hung is given an inclination inward, or toward the center of the entry, of from 1 to 1½ in. per ft. of height, according to the strength of the air current. By this means the door is given a certain fall, which causes it to close by reason of its own weight.

As indicated in the figure, the space around the edges of the door is closed with a canvas flap, which prevents the leakage of air past the door when it is closed; or a canvas cushion can be made all around the edge of the door, by packing the canvas with straw after nailing one edge of the strip on one side of the door, the other edge being then drawn over and nailed to the opposite side. At the bottom of the door only the canvas flap is used. The hinges are the ordinary strap hinges. The bolt hooks to which the door is hung are set in the center of the post. Care must be taken that sufficient headroom is given on each side of the door to enable it to swing free, as the door rises when opened, but the thickness of the collar above the door usually provides sufficient room to overcome this difficulty. H. E. MAINE.

Des Moines, Iowa.

Efficient Mine Foremen

Letter No. 32—I have read with great interest most of the letters relating to "Efficient Mine Foremen," and want to give in brief what to my mind constitutes such a foreman.

The efficient mine foreman must have a thorough, practical knowledge of all mining methods and the different types of mining machinery and understand their application and adaptation to different conditions in the

mine. He must be able to judge of what is a fair day's work in coal mining, as well as be a good judge of human nature and able to handle men skillfully and successfully in the mine.

A mine foreman must be firm, self-controlled and persevering. He should be devoid of any biased opinions in respect to men, machinery or methods of working. In addition to this he should be fearless, prompt, patient, cautious and prudent, industrious, observing and, above all, of sober habits. His dealings with men should be without fear or favor, and when it comes to a showdown, the men in his charge must understand that he is foreman and his authority is supreme. If it should happen that he has a man that he cannot control or manage successfully, it will be better for all concerned if he dismisses such a one at once from the service of the company.

The safety of the men and the security of the property in his charge should be the mine foreman's first consideration, because everything else depends on this important factor. The quality of the coal produced, as well as the cost of production, stands second to the consideration of safety in all mining work.

Coral, Penn. JOHN HAMMOND.

Fan Ventilation

Letter No. 1—The question raised by S. D. Hainly, *Coal Age,* Jan. 29, p. 221, is one that every mining student accepts with hesitation at first. One is prone to believe with Mr. Hainly that the speed of the fan will be increased when the mine resistance is cut off by short-circuiting the air current at the foot of the shaft. A more careful consideration of the question, however, proves that this cannot possibly be true.

Assume, for example, that the fan is working normally, forcing the air through the mine under a certain water gage and consuming a certain power applied to the fan shaft. Now, when the air is short-circuited by setting open the division doors at the foot of the shaft all will agree that the water gage in the fan drift will fall and a larger quantity of air will pass through the fan than before.

The proposition assumes that the power applied to the fan shaft is to remain unchanged, and disregarding for the moment a slight change in the efficiency of the fan, the power on the air also is practically the same after the doors are set open as before. But we know that the power on the air is equal to the product of the quantity of air in circulation and the unit pressure indicated by the water gage, and therefore these two quantities vary inversely as each other. That is to say, as the quantity of air increases, the pressure or water gage falls, their product remaining constant.

Suppose, now, that the speed of the fan increased when the doors were set open. Such increase of speed would mean a higher instead of a lower water gage. And we must conclude that the speed of the fan, therefore, will decrease in conformity with the lower water gage, which results from short-circuiting the air.

Again, suppose a heavy fall of roof occurs on the main aircourse in a mine so as to almost choke the passage and block the air current. Assuming, as before, that the power applied to the fan shaft remains unchanged, the water gage in the fan drift will be increased because the mine resistance is increased by the fall in the aircourse. And this increase of water gage means an increase in the speed of the fan. The natural assumption, in this case, would be that the fan would slow down when the aircourse was blocked by a fall. But we see plainly that the increased water gage calls for a higher speed of the fan, which is the actual fact and which has been observed many times in careful tests made by different persons in different mines.

When testing this principle in daily practice in a mine, it should be remembered that a large door in a shaft bottom will have a greater effect in short-circuiting the air than a small manway door. It is also necessary to make due allowance for natural ventilation that may be present caused by an air column either in the shaft or in the mine and unexpected because unobserved. Such natural ventilation would impair the results of the test and make them misleading. ROBERT MCCUNE.

Delagua, Colo.

A Longwall Proposition

Letter No. 3—Having had much practical experience in both longwall and narrowwork, I was struck with the suggestion by Joseph Jelinek, *Coal Age,* Feb. 5, p. 266, wherein he proposes to keep only four roads open leading to the working face. It is not stated how far apart these roads would be, but I fear the distance along the face, between the roads, might be too great for the miners to escape safely in case of accident, as the height of the seam would not permit them to travel rapidly along the face and there would be a chance that they might be caught and lose their lives.

Provided the distance between the roads is not too great, I believe that Mr. Jelinek's suggestion is practicable. For example, let us assume there are 12 or more roadways open in a mine. These can be reduced by selecting roadways 1 and 6 to be kept open and abandoning the four intermediate roads. If the roads are 30 ft. apart, this will give 180 ft. of coal face between the roads that are kept open. A track should be laid along the face as straight as possible, from roadhead to roadhead. This arrangement will bring the cars close to the men for loading. When the face has been advanced, say 6 ft., the track should be shifted forward.

Now, compare this arrangement with that in the room-and-pillar system of mining. Assuming the rooms to be 30 ft. apart, there will be only six cars for a trip coming from 180 ft. of entry, whereas the same length of face in longwall work would give nine cars to a trip and allow 20 ft. of face for each miner. This would not only increase the output of the mine, but provide work for more men.

If it were possible to make the roads 9 ft. wide instead of 6 ft., a double track could be laid in each road, one for the right-hand and the other for the left-hand face. It is unnecessary to remark that care should be taken in building the cogs or cribs and roadpacks so that the roads will always be easily kept open. The cogs should be built from 5 to 6 ft. apart with packwalls between them. The peculiar advantage of longwall work is the good ventilation possible at the working face. The face track should be protected by a row of props set from 5 to 6 ft. apart along the entire face. PRACTICAL.

Plains, Penn.

Inquiries of General Interest

"Dead Hole" in Blasting

Please explain the meaning of the term "dead hole" in blasting. Does it mean a hole drilled in the coal, at right angles to it? MINE EXAMINER.

Peoria, Ill.

A dead hole, in blasting, is one in which the charge is so located that it cannot perform the work intended or a hole in which the line of least resistance corresponds to the axis of the hole. A hole may be drilled at right angles to the face and yet not be a dead hole if properly mined or side-cut. Again, a hole drilled at an angle with the face may be so bound by projecting tops or bottoms as to be a dead hole.

Data in Colorado Coal Mining

I would greatly appreciate answers to the following questions relating to coal mining in Colorado:

(a) How many hours do the miners work in a single shift? (b) What are the daily wages paid to drivers, trackmen and inside laborers? (c) What is the average number of days a week that the coal mines run, and do they run less regularly in summer than in winter? (d) Are the coal mines in Colorado unionized? (e) Are the examinations for mine foremen and firebosses more difficult in Colorado than those in Kentucky? (f) How many years of experience in gaseous mines must a person have before he can take the examination and receive a certificate of competency to act as mine foreman or fireboss? OSTEL BULLOCK.

Cleaton, Ky.

In answer to these questions we submit the following information:

(a) The miners in Colorado work 8 hr. each shift.

(b) The wages of drivers, trackmen and inside laborers vary from $3 to $3.25 a day.

(c) The coal mines in Colorado run an average of 3.2 days a week. The work is less regular in the summer than in the winter season. Many of the mines in the northern part of the state, operating lignite veins, are closed up entirely or work but a few days a month during the summer.

(d) The mines in Colorado are not unionized.

(e) The questions asked in the examinations of mine foremen and firebosses for certificates of competency are plain, simple questions that avoid as far as practicable the use of mathematics. The aim of the examining board is to secure candidates for these positions who are thoroughly practical in their ideas and have a good knowledge of mining work and conditions. It is difficult to compare these examinations with those in any other state.

(f) Sec. 40 of the coal-mining laws of Colorado (1913) provides that certificates of competency shall be issued to any person who shall pass a satisfactory examination required by the examining board for the position desired and satisfy the board that he has been employed in underground positions in the mines of Colorado for two years prior to such examination. The law also provides that a further certificate shall be issued to any person who can produce satisfactory evidence that he has been employed for a period of one year immediately preceding Apr. 1, 1913, and has continuously and capably performed the duties of the position desired.

Neutralizing the Discharge from Oil Engines

I would much appreciate any information in reference to rendering harmless and odorless the gases discharged from oil engines in underground work.

D. D. DUNKIN, Superintendent,
Buck, Okla. McAlester Coal and Coke Co.

This question has been asked many times, and manufacturers of gasoline mine locomotives and other gas engines have investigated to find, if possible, not only a means of deodorizing the discharge from these engines, but to render the discharged gases harmless.

Coal Age is advised that no satisfactory method has yet been found of neutralizing the exhaust gases. When the exhaust is conducted through a lime mixture, or even a spray of water, the unpleasant odor is largely reduced, and while a considerable amount of the carbon dioxide (CO_2) is thereby absorbed, the exhaust is still an element of danger because the carbon monoxide contained in the gas has not been eliminated. No practical method has been found that it will be possible to use in coal mining practice.

The question has been investigated also by the Federal Bureau of Mines, but Bulletin 74, recently published by the Bureau, entitled "Gasoline Mine Locomotives in Relation to Safety and Health," fails to suggest any means of avoiding the ever-present danger arising from the imperfect condition of the engine. The statement is made that the risk is light when the locomotive is in perfect condition. But should the carburetor not be properly adjusted or if there is any defect in the ignition system, owing to a dirty or broken spark plug, faulty wiring or improper timing of ignition, the bulletin states there may result the production of large quantities of carbon monoxide caused by unburned charges in the cylinder being ignited in the muffler under atmospheric pressure, by a succeeding burning charge.

One of the largest manufacturers of gasoline locomotives for mine use states: "The only satisfactory solution for a problem of this sort is good carburetion and maintaining a fair amount of air in circulation so as to neutralize the exhaust from the engine. On a gasoline mine motor the trouble generally arises from poor carburation in connection with leaky valves and piston rings, which permit a certain amount of the charge to leak by without being properly consumed or burned."

Examination Questions

Miscellaneous Questions

(*Answered by Request*)

Ques.—In a square airway, having an area of 56 sq.ft., there is passing 50,000 cu.ft. of air per min. It is desired to increase this circulation 5,000 cu.ft. per min. In order to do this, how much must the airway be enlarged in section, assuming the power to remain constant?

Ans.—Assuming that the square cross-section of the airway will be retained when making the enlargement, we may apply the rule: For a constant power on the air, the fifth power of the side of a square airway varies as the cube of the quantity of air in circulation. In other words, for a constant power on the air the fifth power of the side ratio of a square airway is equal to the cube of the quantity ratio; or the side ratio is equal to the fifth root of the cube of the quantity ratio.

Since the circulation is to be increased 5,000 cu.ft. per min., the quantity ratio is 20,000 : 15,000, or 4 : 3, which is also written 4/3. But the side of the original airway is $\sqrt{56} = 7.48$ ft., and calling the side of the enlarged airway x, we have

$$\frac{x}{7.48} = \sqrt[5]{\left(\frac{4}{3}\right)^3} = 1.188$$

and $$x = 7.48 \times 1.188 = 8.89 \text{ ft.}$$

The area of the enlarged airway is therefore $8.89^2 = 79$ sq.ft., practically.

In the practice of mining, however, this airway would be enlarged by taking a "skip" off the rib, which would give a rectangular instead of a square cross-section. The solution in that case is more complicated, but the airway would then have to be widened about 3 ft. 2 in., in order to increase the circulation 5,000 cu.ft. per min., the power on the air remaining constant.

Ques.—A tank delivers 5 gal. of water per min. to No. 1 slope and 3 gal. per min. to No. 2 slope. The tank is filled by a pump that discharges 800 gal. per hr. into it, the tank having a capacity of 2,000 gal. If the pump works 1½ hr. before the water is turned into the slopes, how long will it take this pump to fill the tank, supposing it to have been empty at the start?

Ans.—The tank being empty when the pump started to work, it will contain at the end of 1½ hr. 800 × 1½ = 1,200 gal. Then, to fill this tank will require 2,000 — 1,200 = 800 gal. more of water. The water flowing out of the tank into the slope is 60 (5 + 3) = 480 gal. per hr. Since the pump discharges 800 gal. per hr. into the tank, the gain is 800 — 480 = 320 gal. per hr. The additional time required to fill the tank will then be 800 ÷ 320 = 2½ hr., which makes the total time required 1½ + 2½ = 4 hr. from the time the pump started to work.

Ques.—In an airway 6x6 ft. in section and 1,200 ft. long, there is passing 20,000 cu.ft. of air per min., which is insufficient for the proper ventilation of the mine. Since all the available power is in use, it is decided to increase the circulation in the mine by widening the airway. This work was begun 300 ft. from one end and has proceeded 600 ft., leaving still 300 ft. on the other end the original size of the airway. To what extent will the circulation in the mine be increased at this stage.

Ans.—The total power on the air is always clearly equal to the sum of the powers absorbed in each section of the airway, as explained in *Coal Age*, Vol. 5, p. 538, and to find the general power potential of the entire airway it is necessary to calculate the part power potential for each section and add their reciprocals, which gives the reciprocal of the general power potential of the mine after the middle section of the airway has been widened. By comparing this general potential with the mine potential of the airway before the work was started, the effect on the circulation is shown. The calculation is as follows: The reciprocal of any part power potential is found by the formula

$$\frac{1}{X^3} = \frac{lo}{a^3}$$

The value of this reciprocal for each section of the airway is then found thus, the first and last sections being the same:

Section 1, $$\frac{1}{X_1^3} = \frac{300 \times 24}{36^3} = 0.1543$$

Section 2, $$\frac{1}{X_2^3} = \frac{600 \times 32}{60^3} = 0.0889$$

Section 3, $$\frac{1}{X_3^3} = \frac{300 \times 24}{36^3} = 0.1543$$

Value for airway, $$\frac{1}{X_0^3} \ldots\ldots\ldots\ldots 0.3975$$

The general mine potential for these three sections combined is, then,

$$X_0 = \frac{1}{\sqrt[3]{0.3975}} = 1.36$$

The next step is to calculate the power potential of the original airway, thus

Original airway, $$X = \frac{a}{\sqrt[3]{lo}} = \frac{36}{\sqrt[3]{1{,}200 \times 24}} = 1.174$$

But for a constant power on the air, the quantity of air in circulation varies as the power potential. In other words, the quantity ratio is equal to the power-potential ratio, or in this case,

$$\frac{Q_2}{Q_1} = \frac{Q_2}{20{,}000} = \frac{1.36}{1.174}$$

And $$Q_2 = 20{,}000 \times \frac{1.36}{1.174} = 23{,}160 \textit{ cu.ft. per min.}$$

which is the increased circulation due to enlarging the sectional area of the airway in the middle section.

Ques.—If you had charge of a gaseous mine ventilated by a fan and the engine broke down, how would you continue to run the rest of the day?

Ans.—Cut the run short and call out the men at once.

Coal and Coke News

Harrisburg, Penn.

Six men were killed in No. 6 slope, of the Hollenback No. 2 colliery of the Lehigh & Wilkes-Barre Coal Co. on Mar. 9. The exact cause of the accident appears to be unknown. Whether an explosion of gas or powder started a mine fire, or whether the mine fire caused an explosion of gas is the question state mine inspectors and company officials are trying to ascertain. Safety lamps were used exclusively in this section of the mine.

No. 6 slope and airway make a continuous circuit for air with a line of chambers lying east of the slope. It is in No. 1 east, where the fire is and where the bodies of the men are. The scene of the fire is about 3,000 ft. from the shaft. Approaching it from the shaft, entrance may be gained to No. 1 east gangway from its first junction with No. 6 slope or by making the circuit and approaching it with the air current. The rescue party first tried the shortest approach but found fire and a wall of smoke, cutting them off.

After being on the ground and in the mine almost continuously for over 48 hr. Chief of the Department of Mines, James E. Roderick, with State Mine Inspectors, T. J. Williams, D. T. Davis, John B. Corgan and Joseph J. Walsh and General Manager C. F. Huber and General Superintendents E. F. Newbaker and John D. Joseph agreed that the only possible way to save the mine from the fierce fire which is raging would be to seal it off and abandon all hope of rescuing the five men in the fire area.

Every effort has been made to approach the portions of the gangway where the bodies of the men are supposed to be, but from all sides the rescuers under the personal direction of the state and company officials named above have been confronted by smoke, gas, flames and frequent concussions caused by recurring gas explosions that make it exceedingly dangerous for them to go near.

Concrete and brick stoppings 12 ft. wide have been installed on the intake and return of the slope and the air supply cut off, and all of the oxygen between the walls will be consumed and the smoke and gas will smother the flames.

It is thought that at least three weeks will be necessary to attain that end. The fire ranges over a distance of 1,000 ft. and has burned into the coal and rock. This mine is situated in the heart of the City of Wilkes-Barre. This is the second disaster for this company within a month, for on Feb. 9, 7 men were killed at Lance No. 11 Colliery at Plymouth.

Hospitals Increase their Rates

Protesting against the increased charges of hospitals receiving state aid in the case of employees of corporations, and stating that the Compensation Board had received reliable information to the effect that hospitals had formed a combination to increase their former charge of $1 per day to $2, with a minimum charge of $5, the State Compensation Board, has reported to Governor Brumbaugh, telling him of these facts, and reminding him that he had the power to end this practice, as these hospitals would soon be seeking state aid.

Insurance adjusters also are protesting against the increase of charges of $2 a day, where, heretofore, the charges had been $1 to miners and employees of other industrial plants from which injured workmen were removed to the hospitals.

The Compensation Act allows an injured employee $25 for hospital bills. The rate in effect generally throughout the state is $1 a day to ward patients and $1.50 in some places to corporation patients. It is argued by the authorities that if this amount was increased to $2 a day, it would mean that the injured workmen would be cared for in the hospital at the expense of the insurance company or employer only 12½ days. In most cases where a man is sent to a hospital after suffering injuries while at work he remains in the institution more than that length of time. This would mean that the injured employee would be forced to pay the difference, or that there would be a great increase throughout the state in the number of charity patients.

PENNSYLVANIA

Anthracite

Pottsville—The breaker of the Lucy R. colliery at Port Carbon recently caught fire and was threatened with total destruction, but the fire was finally extinguished after the loss of the boiler house. The mine will be idle until the power plant can be replaced. The plant is owned by Slattery Bros. of Philadelphia.

Shamokin—The large breaker at the abandoned workings of the W. R. McTurk Coal Co. at Black Ridge colliery is being torn down and will be erected at a colliery in this district.

Hazleton—The Lehigh Valley Coal Co. with the resumption of stripping operations here has given work to a large number of workmen.

Lansford—The Lehigh Coal and Navigation Co. is laying a new pipe line from a nearby colliery whereby it intends to carry mine water to the burning coal deposit at Summit Hill.

Duryea—The Lehigh Valley Coal Co. was hampered on Mar. 9 in handling freight by a mine cave that caused a suspension of service on the mountain cut-off branch. The cave-in occurred over the workings of the Barnum colliery of the Pennsylvania Coal Co., settling from 6 to 8 ft. for a distance of about 150 ft. It was discovered by track walkers as the surface began to settle. A large force of men and gravel trains were sent to fill the cavity with ashes, rock and culm.

Avoca—Ten houses were damaged by a mine cave on Mar. 9. Robbing pillars is said to have caused the cave, which spread over a large area and continued several hours. Other properties were threatened and it is feared another cave may occur.

Plymouth—The boilers, hoisting engines, breaker machinery, etc., that did service at Dodson No. 12 colliery, Plymouth Coal Co. for several years have been sold to a junk dealer who has a force of men tearing them out and hauling them to scrap yards. In the course of a short time the head house over the shaft will be dismantled lest it take fire, endangering the upper veins of the mine that have escaped the interior flood. The gas might be ignited and as a result surface property would suffer. Piece by piece all outside material of this colliery is being removed and the time is not far distant when the breaker will follow the head house, thereby avoiding the payment of tax to the borough and county.

Lattimer—For the death of his son, who was smothered in a rock tunnel in March, 1915, Arcagelo Visentin, has filed suit against Pardee & Bros. Co. and asks $10,000 damages. The coal company is charged with negligence in not safeguarding an air passage which furnished air to the end of a 2,000 ft. tunnel. There was only one check door to turn the air into the tunnel, and when it was blown down by a blast the victim was overcome with white damp.

Shenandoah—Three men were instantly killed and five seriously injured at Maple Hill colliery, Philadelphia & Reading Coal and Iron Co., by a fall of coal, on Mar. 5. The men were on extra duty repairing an old breast and fitting it up to hold refuse to be washed through a bore hole from the surface to fill up other old workings. One of the men, it is supposed, pulled out an old prop supporting the top and a large quantity of roof fell, burying the men under it.

Bituminous

Connellsville—The weekly production of coke throughout the Connellsville district is nearly stationary at approximately 445,000 tons. However, more ovens are being put in operation. The region is at present operating at about 90% of maximum capacity.

Uniontown—The holdings of the Isabella-Connellsville Coke Co. were sold at Sheriff's sale on Mar. 6. The purchasers were Arthur E. Braun, John W. Chalfant, and John O. Miller, who represented three Pittsburgh banks. The price was $250,000. The purchase included mining machinery, coke ovens, and 2,950 acres of coal lands. The sale was at the instance of the Colonial Trust Co., of Pittsburgh, receivers of the company.

Charleroi—Two steel coal boats, each containing 30,000 bushels of coal, and a wooden barge containing 5,000 bushels went over Dam No. 4 near here recently and were wrecked. The loss is $35,000. The towboat "Sailor" was caught in the strong current of the swollen river and the boat had to be cut adrift.

Connellsville—In a deal consummated Mar. 11 A. W. Cottom, of Uniontown, sold to S. A. Silcox, of Connellsville, 100

acres of the tract of 5,065 acres held in Marshall County, West Virginia, by the Cameron Coal and Coke Co. for $100 per acre. In the deal $9,000 worth of Connellsville realty was transferred to Mr. Cottom, the remainder being paid in cash.

Uniontown—About 25 stockholders of the Strange Creek Coal and Coke Co. attended the annual business meeting of the company on Mar. 11. The company holds about 40,000 acres of coal in Braxton County, West Virginia. Several inquiries concerning the tract have been received and power was given the directors to option the holdings as they see fit, being bound, however, to consider nothing less than $60 an acre. The following officers were reëlected: John G. Hibbs, president; S. L. Masten, secretary, and Fred P. Truesdale, treasurer.

WEST VIRGINIA

Fayette—The Branch Coal and Coke Co. is preparing to put in blast 50 coke ovens.

Vivian—The Houston Collieries Co. is installing a new Robinson turbine ventilating fan, with a capacity of 300,000 cu.ft. per min.

Bluefield—The Norfolk & Western is preparing to complete its double-tracking between here and East Radford to facilitate the movement of eastbound coal.

Craneco—The Lorain Coal and Dock Co. will build 55 additional coke ovens, anticipating a good coke market for the next two or three years. John A. Esser is general manager.

Rush Run—Sixty-three of the coke ovens at the Brooklyn mine of the Scotia Coal and Coke Co. are being repaired and will be put in blast during the next few days in making foundry coke.

Eccles—Eight men driving two headings for the New River Collieries Co. and working double shift, that is, 12 hr. per day, excluding Sundays, earned a total of $2,800 during the month of November, 1915, or $350 per month each.

Charleston—The West Virginia Gas Coal Co. which made its first shipment on Feb. 2 is now shipping an average of about 300 tons daily, and has not been idle a single working day since it began operations. New machinery and equipment is being installed, and as soon as this is completed the capacity of the mine will be increased to about 1,000 tons per day.

VIRGINIA

Norton—The Esser Coal and Coke Co. will build shortly 25 coke ovens, anticipating a good market for some time. John A. Esser is general manager.

ALABAMA

Birmingham—Twenty men passed the semiannual examination for first- and second-class foremen and firebosses in the examination held before Chief State Mine Inspector C. H. Nesbit.

Coalburg—The old beehive ovens and the Thomas coke ovens, which have been out of operation about 10 years, are being rehabilitated and will soon be in operation. Sixty to 110 coke ovens will be repaired in the two batteries mentioned and a daily production of about 200 tons of coke is expected.

KENTUCKY

Madisonville—Mine Rescue Car No. 3 of the United States Bureau of Mines is giving demonstrations here. It goes from here to Providence on Mar. 18 to remain until Mar. 31. It will be at Morganfield, Apr. 1 to 8.

Whitesburg—Two hundred miners, largely from east Tennessee and western North Carolina have just been imported by the Consolidation Coal Co. and the Elkhorn Coal Corporation to work in the Jenkins, McRoberts and Fleming fields. There is a shortage of labor everywhere in the eastern Kentucky mines.

Louisville—Coal operators of Kentucky are to be entertained by the Louisville Board of Trade at a banquet. The Board of Trade is seeking to establish closer commercial relations between the eastern and western Kentucky mining sections. Louisville commercial interests have run trade specials into the mining regions of Kentucky for that purpose. Manufacturers and merchants will be invited to meet the operators at the coming banquet.

Frankfort—A bill permitting guardians to lease coal lands of their wards for a longer period than the time intervening until they reach their majority is being backed in the General Assembly by Senator Brock, of Harlan. He declares that the passage of such an act is vitally needed for the development of the eastern Kentucky coal fields. Senator Hite Huffaker, of Louisville, is leading the fight on the bill, declaring that its passage would work injury to infant heirs. The bill is not yet out of committee, but Senator Brock is asking that it be given a first reading.

Frankfort—The Workmen's compensation bill, a measure concurred in by employers, labor and insurance companies, has passed both houses of the Kentucky General Assembly and is believed to be assured of signature by the Governor, as it was declared for in both the Democratic and Republican platforms. Senator Brock, of Harlan, in the eastern Kentucky coal fields, made a fight to have eliminated sections to deprive employers of the right to make the common law defenses of contributory negligence, assumption of risk and responsibility of fellow servant. He succeeded in accomplishing this upon the bill's initial appearance in the Senate, but the sections were restored by the House and sent back to the Senate for confirmation. On their second appearance, they went through by a majority of one vote.

OHIO

Zanesville—A conference of miners in District No. 6 of Ohio is to be called shortly, to meet here, for the purpose of taking action on the new wage scale agreed upon at the New York conference. Thereafter a conference of miners and operators will be held, to decide upon the method of apportioning the 3c. increase agreed upon for machine-mined coal.

Rogers—E. C. Vale has leased about 1,000 acres of coal land a mile south of here which will be fully tested out by drilling, preparatory to systematic development. It is understood that a large company is to be formed to handle the proposition. Previous tests revealed the presence of coal on the tract, but it is desired to locate the veins definitely, with reference to depth, quality, thickness and other factors.

Columbus—Steps have been taken by the miner's organization in Ohio for the organization of the employees of the various stripping operations in Jefferson County. In all there are three of the stripping operations working and several are being developed. The employees of the Beech Flats Coal Co. and the Modern Mining Co. have been organized. No steps have been taken for the organization of the employees of the Piney Fork Coal Co. at Smithfield, Jefferson County. J. W. Blower, president of the company, has posted a notice calling attention to the fact that the company is paying the full union scale to its employees. This takes away the incentive for the men to unite with the miners' organization.

Columbus—The announcement has been made by officials of the Sunday Creek Coal Co. that the property of the Continental Coal Co., which was under lease to it, has been turned back to the bondholders. The property consists of 13 working mines and a number of exhausted operations. N. D. Monsarrat has taken charge of the property for the bondholders and a reorganization may be effected. The Sunday Creek Co. still has 45,000 acres of virgin coal lands in the Buckeye state besides six working mines. There are locations for 11 new mines. The reason for the giving up of the leases is because of unprofitableness of mining in Ohio with existing freight rates and the high mining scale. Minimum royalties on the Continental property were so large that it was difficult to make a profit. The surrender of the lease gives the Sunday Creek properties a better standing in Ohio.

ILLINOIS

Christopher—Twelve men were injured recently when the cage in which they were descending into the mine slipped and shot to the bottom. The injured men were sent to hospitals at Ziegler and Belleville.

Peoria—Illinois operators and miners will meet in biennial state convention here Mar. 23. There are 280 demands scheduled to be taken up but as many of the matters in dispute were settled at the New York conference, it is expected that the meeting will be short. C. E. McLaughlin and William Jess, who attended the New York conference as representatives of the Illinois Coal Operators' Association, have returned.

Hillsboro—Receiver Peabody, who has been managing the mines at Witt, Kortkamp and Taylor Springs and at other points on the Chicago & Eastern Illinois R.R., has resigned. T. C. Keller, owner of the Sessor mines, will be his successor. The change of receivers has given rise to hopes that the Witt and Taylor Springs mines, which have been operated only a part of the time, will be operated regularly.

PERSONALS

E. P. Worden, formerly of Fred M. Prescott Steam Pump Works, Milwaukee, Wis., has been appointed chief engineer of Henry R. Worthington, Harrison. N. J.

John Knies, of Breese, Ill., has been appointed by Governor Dunne as a member of the State Board of Mine Examiners.

A. G. Smart, who has been chief electrician at the Ronco mines of the H. C. Frick Coke Co. for several years, has accepted a position at the Sterling mine with the Consolidated Coke Co.

George Walters, for some years chief clerk to J. George Eisle, general coal sales agent of the Hudson Coal Co., has been promoted to assistant to A. H. Fine, chief auditor of the company.

John H. Walker, president of the Illinois coal miners' union, will make an address in Belleville, Mar. 19, on the coöperative store movement, which is being fostered by the Belleville Trades and Labor Assembly.

Daniel B. Wentz, president of the J. S. Wentz & Co., anthracite mining firm, recently underwent an operation for appendicitis at the German Hospital in Philadelphia and his condition is reported as being quite satisfactory.

P. P. Bourne, formerly chief engineer of Blake & Knowles Steam Pump Works, East Cambridge, Mass., is again associated with the International Steam Pump Co. in connection with the special engineering work located at the main office, 115 Broadway, New York.

S. C. Van Norman, formerly Buffalo agent of the Pittsburgh-Westmoreland Coal Co., but later in the coal business in Cleveland, has formed a partnership with W. A. Swacofer, Canadian manager of the Ashtabula coal-car ferry, and gone into other business at Youngstown, Ohio.

Eli T. Conner, mining engineer, announces the removal of his principal office from Room 1315, Stephen Girard Building, Philadelphia, Penn., to Room 459, Mutual Life Building, 26 Liberty St., New York, N. Y. Announcement is also made that he will occupy Rooms 616, 618, 620 and 622, Union National Bank Building, Scranton, Penn.

President Bush of the Birmingham Chamber of Commerce has returned from New Orleans where he succeeded in getting three war vessels to make tests of Alabama coal. It is believed that the government will find the coal equal to any now used, and this will be a great endorsement for it. Black Creek coal is that under test.

OBITUARY

J. W. Bradley, president of the Trosper Coal Co., has taken charge as general manager of the Wheeler plant of the Brush Creek Mining and Manufacturing Co., one of the larger operations in the Brush Creek district of Knox County.

Colonel Alfred Hicks, aged 79, coal operator, steel manufacturer and financier died at his home in Pittsburgh on Mar. 9. He founded the Allegheny Steel and Iron Co. and up to six years ago had been connected with 20 coal companies. Colonel Hicks was a veteran of the Civil War and was in Ford's Theater when President Lincoln was assassinated.

Charles F. Godshall, second vice-president and treasurer of the Westmoreland Coal Co., died Mar. 9 at his home in Philadelphia from heart failure, at the age of 61 years. Mr. Godshall had been connected with the Westmoreland Coal Co. for 36 years, for 28 of which he was treasurer of the firm. He was also second vice-president and treasurer of the Manor Gas Coal Co. and second vice-president of the Pennsylvania Gas Coal Co. He is survived by a widow and two children.

Thomas B. Crawford was called by death recently at the Methodist Hospital in Indianapolis, after two operations for abscess of the mastoid bone. Mr. Crawford was 29 years of age, the youngest of four sons of C. W. Crawford, president of the Crawford & McCrimmon Co., Brazil, Ind., builders of mine equipment machinery. He had acquired a thorough schooling in the iron- and brass-foundry business and for more than 8 years has been the superintendent of the foundry department of the above named company.

Theodore Voorhees, president of the Philadelphia & Reading Railway Co. died suddenly at his home at Elkins Park on Mar. 11. Two months ago Mr. Voorhees underwent a serious operation but was thought to have practically recovered, having been at his office a short time previous to his death exhibiting his usual vigorous health. On May 8, 1914, he became president of the Philadelphia & Reading Ry. following the death of the former incumbent, Geo. F. Baer. Mr. Voorhees was born in New York City on June 4, 1847, being in his 69th year at the time of his decease. At the age of 17 years he entered Columbia University, but before the completion of his course entered the Rensselaer Polytechnic Institute of Troy, N. Y., of which institution he was a trustee at the time of his death. He first entered railroad work in the employ of the Delaware, Lackawanna & Western R.R., later becoming affiliated with the Delaware & Hudson, and afterward went to the New York Central, in which company he rose to the position of general superintendent, going to the Philadelphia & Reading on Feb. 1, 1893, in the capacity of vice-president in charge of traffic. Mr. Voorhees was married on Feb. 4, 1874, to Miss Mary E. Chittenden, of Syracuse, N. Y., who with 7 children survive him. He was also a member of prominent scientific and social organizations, and director in a number of financial institutions.

TRADE CATALOGS

The Alexander Milburn Co., Baltimore, Md. "The Milburn Light." Illustrated; 52 pp.; 6x9 in.

Fairbanks, Morse & Co., New York, N. Y. "Pump Department." Illustrated; 176 pp.; 6x9 in.

Gifford-Wood Co., Hudson, N. Y. Bulletin No. 17. "Pivoted Bucket Carrier." Illustrated, 16 pp., 6x9 in.

The Western Electric Co. "Western Electrical Supply Year Book for 1916." Illustrated, 1504 pp.; 6½x10 in.

The Wheeler Condensing and Engineering Co., Carteret, N. J. "Centrifugal Pumps." Illustrated; 34 pp.; 6x9 in.

The Keystone Driller Co., Beaver Falls, Penn. "The Keystone Traction Excavator." Illustrated; 16 pp.; 8½x11 in.

Malcolmson Briquet Engineering Co., Chicago, Ill. "Malcolmson Briquetting Plants." Illustrated; 26 pp.; 8½x11 in.

Wheeler Condenser and Engineering Co., Carteret, N. J. Bulletin 108-A. "Centrifugal Pumps." Illustrated, 34 pp., 6x9 in.

Richardson Scale Co., Passaic, N. J. "Automatic Weighing of Coal and Water in Power Plants." Illustrated; 64 pp.; 8x11 in.

The American Safety Lamp and Mine Supply Co., Scranton, Penn. "Safety Lamps and Supplies." Illustrated; 42 pp.; 8x10½ in.

PUBLICATIONS RECEIVED

"Natural Gas Resources of Parts of North Texas," U. S. Geological Survey, Bulletin 629. Illustrated; 126 pages; 6x9 in.

"Manufacture and Uses of Alloy Steel," by Henry D. Hibbard, Dept. of Interior, Bureau of Mines, Bulletin 100. Unillustrated; 77 pages; 6x9 in.

"Oil and Gas Near Basin, Big Horn County, Wyoming," by Charles P. Lupton, U. S. Geological Survey, Bulletin 621-L. Illustrated; 34 pages; 6x9 in.

"Shot Firing in Coal Mines by Electricity Controlled from Outside," by H. H. Clark, N. V. Breth and C. M. Means. Unillustrated; 36 pages; 6x9 in.

"Annual Report of the Director of the Census to the Secretary of Commerce for the Fiscal Year Ending June 30, 1915." Unillustrated; 29 pages; 6x9 in.

"Cassiterite in San Diego County, California," by W. T. Schaller, Dept. of the Interior, U. S. Geological Survey, Bulletin 620-P. Illustrated; 4 pages, 6x9 in.

"Sampling and Analyzing Flue Gases," by Henry Kreisinger and F. K. Ovitz, Dept. of the Interior, Bureau of Mines, Bulletin 97. Illustrated, 70 pages, 6x9 in.

"Coal Resources of District 8 (Danville)," by Fred H. Kay and K. D. White, Illinois Coal Mining Investigations, Co-operative Agreement, Bulletin 14. Illustrated; 67 pages; 6x9 in.

"Gasoline Mine Locomotives in Relation to Safety and Health," by O. P. Hood and R. H. Kudlich, Dept. of the Interior, Bureau of Mines, Bulletin 74. Illustrated; 83 pages; 6x9 in.

"Preliminary Report on the Economic Geology of Gilpin County, Colorado," by Edson S. Bastin and James M. Hill, U. S. Geological Survey, Bulletin 620-M. Illustrated; 29 pages; 6x9 in.

"Mine Ventilation Stoppings," by R. Y. Williams, Illinois Coal Mining Investigation, Co-operative Agreement, Dept. of the Interior, Bureau of Mines, Bulletin 99. Illustrated; 30 pages, 6x9 in.

INDUSTRIAL NEWS

St. Louis, Mo.—The Willis Coal and Mining Co. reports it has closed the Gulf mine indefinitely for lack of a market for the coal and prices that would return a margin above cost.

Chicago, Ill.—Bondholders of the Chicago & Eastern Illinois coal properties have asked Judge Carpenter to appoint Theo. C. Keller receiver in place of Messrs. Peabody, Deering and Woolley, who have resigned.

McRoberts—Damage of from $40,000 to $50,000 was caused by a fire in mine No. 215 of the Consolidation Coal Co. at this place. The fire which, it is said, resulted from crossed electric wires, burned about five days before it could be extinguished.

Pittsburgh, Penn.—The Wabash-Pittsburgh Terminal Railway Co. has ordered 750 gondola coal cars from the Pressed Steel Car Co., making the total February car contracts 11,949 which will require about 120,000 tons of rolled steel to build.

Philadelphia, Penn.—The Lehigh & New England Railroad Co., which is closely affiliated with the Lehigh Coal and Navigation Co. has issued $2,000,000 worth of general mortgage 5 per cent. gold improvement bonds, dated July 1, 1914, and due July 1, 1954.

Centralia, Ill.—The Burlington R.R., to facilitate the handling of the heavy coal traffic between here and Ziegler, 50 mi. away, is laying a double track the entire distance. The company has just completed four sidings, each a mile long, at the mining town of Ziegler.

Washington, D. C.—The Interstate Commerce Commission has suspended the rates on coal via the Colorado & Southern R.R. and other roads from South Canon, Colo., to points in Wyoming, South Dakota, Nebraska and Kansas, stating that the rates "were unjustly discriminatory."

Columbus, Ohio—For the first time in history of navigation on the Ohio River a cargo of coal is being shipped from West Virginia mines to supply the steam demand in the Pittsburgh district. This unusual state of affairs results from the unprecedented activity among the iron and steel mills.

Hazleton, Penn.—At the coroner's inquest into the death of Jacob Michael, a miner employed at the Cranberry mines of A. Pardee & Co., a verdict was rendered that death was due to his own negligence. The man was killed by a lump of coal from a blast after the foreman had notified him to seek a place of safety.

Martins Ferry, Ohio—The Forsythe Coal Co. will immediately rebuild its tipple which was destroyed by fire recently. The fire cost $45,000 and 300 men are idle. All the generators, hoisting machinery and a new box-car loader were destroyed. Current to keep the fans going is being supplied by the Murray Hill mine.

Columbus, Ohio—A meeting of the board of directors of the Michigan-Ohio-Indiana Coal Association will be held in Columbus soon for the purpose of fixing the date and appointing committees to arrange for the annual meeting, which will be held at Cedar Point, Ohio, either the last week in July or the first week in August.

Springfield, Ill.—The Chicago & Alton Railroad Co. has ordered the discontinuance of storage of bituminous coal at North Springfield, on the assurance of coal operators that there will be no shutdown of the mines on Apr. 1. The 65,000 tons which have been stored will be distributed to the various coal stations as soon as the supply now on cars has been exhausted.

Middlesboro, Ky.—The Virginia Iron, Coal & Coke Co., which has been renovating the old blast furnace here for several weeks, will begin operations within a month. The local furnace has been idle for 8 years. Resumption of operations will give employment to 500 men. Coke for the local plant will be shipped in from the Virginia operations of the company.

Buffalo, N. Y.—About 1,200 of the 10,000 machinists in the city struck last week for a 50-hour week and higher wages. When they went out several of the leading manufactories shut down, throwing 8,000 men out of work. Whether the strike will spread or the strikers will return to work is not yet determined. The strike reduces the consumption of coal materially.

St. Louis, Mo.—The Interstate Commerce Commission has suspended from Mar. 14 to Sept. 14 the operation of schedules in Southern Ry. tariff No. C-1625, providing for increased rates on coal in carloads from mines at Belleville and other points on the Southern to Kansas City and other stations on the Chicago & Alton. The rate was previously suspended from Nov. 15 to Mar. 14.

Bellaire, Ohio—It was recently learned that William Van Meter and several others have leased from Barney Shaver, of Shadyside, 15 acres of coal lying just to the south of the Rail and River No. 2 mine in South Bellaire. Although the arrangements for mining the coal have not been completed, it is understood that it will be mined from the No. 2 mine of the Rail and River Co. The coal will be easily reached and mined at small expense.

Superior, Wis.—Within a short time it is expected that a crew of structural steel workers in the employ of the Heyl & Patterson Construction Co. will commence work on the new coal unloading rig to be erected at the Reiss Coal Co.'s dock on the St. Louis Bay front. The new rig will be electrically operated and will extend across the entire dock a distance of 500 ft. It will be similar in design to the large electric rig already installed.

Philadelphia, Penn.—Beginning with Mar. 8 the Philadelphia & Reading Ry. placed a stringent embargo at Port Richmond piers this city against both anthracite and bituminous coal. It is a number of years since an embargo against coal has been placed at Port Richmond, and with the Port Reading, N. J., piers of the same company included in the same order the New England territory is practically shut off from all water shipments of coal from this port.

Huntington, W. Va.—During the year 1915 there were no less than 22 new operations begun in the valuable coal fields in Wyoming and Raleigh counties. This phenomenal development bids fair to be continued, as four new operations have already been started this year. The four companies thus starting operations are capitalized at a total of more than $500,000. A local machinery dealer of Huntington recently took orders for $65,000 worth of material in one week.

Lansford, Penn.—The Lehigh Coal and Navigation Co. has abandoned the egg-shaped boulet which it has been manufacturing and has installed new presses at the plant which will manufacture a flattened cylindrical briquette, which will, however, have the same cubical contents as the former size. They have also introduced a new oil binder which gives quite satisfactory results and the quantity of ash produced in the consumption of the fuel has been materially reduced, being from 10 to 15 per cent. It is said the company is having quite a little success with the new fuel in competition with pea coal.

Cleveland, Ohio—With the coming of spring there is an awakening in shipping circles at the Great Lake ports. More tonnage of all kinds has been contracted for than ever before this early in the season and it is estimated that 55,000,000 tons of iron ore alone will be shipped. This volume of freight is so large that vessel owners are arranging to break the ice in order to get an early start. Efforts will be made to reach Escanaba, Mich., by Mar. 20, in order to put the vessels in commission. Indications point to an active coal trade in cargo coal for the head of the lakes and preparations are being made for an early start. The tonnage carried over on the docks of Northwest ports is lower than in several years.

Harrisburg, Penn.—The Association of Bituminous Coal Operators of Central Pennsylvania who have mines in the Clearfield district have intervened before the Public Service Commission in the complaints of the Pittsburgh Coal Operators' Association against the rates charged by the Pennsylvania Railroad system from the Pittsburgh district to Philadelphia, Erie and New Castle. The desire is to have the existing basis of rates maintained. It is likely that no decision will be rendered by the commission in the complaints brought by York and Lancaster manufacturers against coal rates from the Clearfield region until the complaints of the Pittsburgh Operators' Association are heard.

Lexington—The tentative schedule of instruction for the practical miners' course to be taken up by the College of Mines and Metallurgy of Kentucky State University, beginning Apr. 3 and continuing through May 17, has been made out and preparations for the work are being undertaken by Prof. C. J. Norwood and T. J. Barr, who will conduct the course. With the greatest demand ever before known in this state now facing the coal-producing concerns of Kentucky the course is expected to attract the largest enrollment since its institution. On May 29 the Board of Examiners of the State Board of Mines will be in session and this will permit those here for the course to take the examination required of mine foremen without an extra trip to Lexington. One feature of the course will be a thorough drill in mining laws and in practical rules which have been formulated for use in mines, based on the laws of the state dealing with mining.

Market Department

General Review

Anthracite circulars well maintained, though market is spotty. Bituminous showing an incipient weakness. More chartering in export trade. Numerous cancellations in Middle West and market weak.

Anthracite—The situation is decidedly spotty, though showing a big improvement over the market a year ago. The movement for the first two weeks of the current month has probably already exceeded the gross for the full month a year ago, while the full winter price schedule prevails at the present time as contrasted with even occasional discounts on the April circular in 1915. Nevertheless, the railroad congestion has produced a chaotic condition. As a result of the embargoes New England points are in desperate need of supplies, and a panic was only averted in that market by the timely removal of the New Haven embargo, permitting shipments four days of the current week. Other points, where the movement is free, are compelled to absorb the extra tonnages, with the result that surpluses are accumulating and the full circulars are maintained with some difficulty.

Bituminous—As previously noted, the agreement on the bituminous wage scale was fairly well discounted, and there has been a temporary recovery in the market. This is due mostly to the railroad congestion, however, and it is not anticipated that the bottom of the decline has yet been reached. Accumulations are large at a great many points, and it is clear that shippers will have to name lower prices over the next two months at least. The outlook on April contracts is still subject to many uncertainties; what business has so far been closed has undoubtedly been concluded at satisfactory advances on the old prices, but consumers are still generally holding out firmly against radical departures from the old figures, with the result that negotiations are deadlocked in most cases, and will hinge largely on the market tendency over the next few weeks.

Exports—Still higher freight rates in the off-shore business have brought out further offers of vessels, and chartering was more active the last week than for some time. The situation in the foreign markets seems to be one of a question of getting coal rather than price, but it is difficult to understand how this business can undergo any further expansion at the current high levels of the freight market. Dumpings at the Hampton Roads piers have fallen off heavily the past two weeks, and are now again about to the low level prevailing previous to the recent boom.

Ohio Valley—The market is quiet, consumers displaying a tendency to use up surpluses accumulated in anticipation of a possible suspension. Most consumers are also well covered on contracts, the movement on which continues very strong. Lake vessels are being overhauled in preparation for an early start, and with the depleted condition of the upper Lake docks there is little doubt of a heavy movement when shipping opens. Difficulties are anticipated in effecting charters at a reasonable rate, and it seems to be already established that a substantial premium above last year's freight will be paid. Consumers have also been unable to determine the exact cost of the awards to the miners in the production of coal, and there seems to be a general disposition to delay the matter of contracting. Prices on the new April contracts are still indeterminate, with buyers and sellers generally far apart. The heavy railroad congestion at Tidewater is also tending to throw additional tonnages into the interior market.

Middle West—Cancellations of orders for storage coal have caused the expected slump in the Middle Western situation, which has been further supplemented by a falling off in domestic business due to the mild weather. The calling in of some heavy railroad orders both for storage coal and current consumption has been a particularly severe test of the market. Dealers are also hard pressed to find a disposal for coal they have under contract. More screenings are offering than for some time and prices are weaker. It is generally accepted in all quarters that the season of activity has come to the end.

A Year Ago—Full effects of the usual pre-spring dullness are now felt, and the hard coalers have made a drastic cut in working schedules. Bituminous consumers feeling out the contract market cautiously and competition keen. Favorable interpretation placed on the developments to date. Shortage of steam sizes at interior points.

Business Opinions

Boston News Bureau—The security market, which is the truest barometer of general sentiment, shows an increasing confidence among both financial and commercial leaders. Interest has shifted largely, temporarily at least, from the foreign field to Mexico. But this is stimulating rather than depressing sentiment. It is taken to mean a further increase in the output of munitions and ordnance in this country and consequently large corporate earnings and values. We never saw a time when the technical and economic positions were apparently so favorable. When we come to look at money, exports, earnings and general trade, there is apparently every reason to be optimistic. It is well to remember that the high prices for raw materials are requiring more capital to manufacture, and consequently money is apt to be worth more.

Iron Age—Any last vestige of doubt as to the runaway character of the steel market is being swept out of the way. Prices reach new danger levels with each week, but demand does not halt on that account; it rather grows. And all the time it is harder to locate the market, $5 a ton difference in quotations on the same material being common. Here is one large steel producer—the largest of all—naming prices on some forms of finished steel for delivery through next year; another is out of the market entirely; a third is selling for the first half of this year but unwilling to quote for the second half; still another puts its price on plates, shapes and bars at 3.50c. for any delivery, thinking to reduce the pressure of new business. The Steel Corporation has put out 2.75c, Pittsburgh, for plates, 2.50c. for shapes and 2.35c. for bars, as the prices it is quoting on steel for car and vessel work, deliveries running through 1917.

Dun—Disregarding precedent, business steadily grows in volume at a time when more or less contraction is usually experienced. It is the period for a temporary lull, but even in retail branches, which ordinarily are most affected, activity is exceptionally well sustained on the whole. Clearance and special sales, being largely patronized, keep the department stores busy, while snow and cold over a wide area have stimulated final distribution of seasonable goods, especially rubber and heavy footwear. Though of benefit in this connection, the storms, however, really proved a drawback by adding to the burdens of the railroads, which continue overstrained by the great rush of traffic. Commercial failures this week in the United States are 377 against 380 last week, 407 the preceding week and 532 the corresponding week last year.

Bradstreet—Trade reports vary little in tenor from those of preceding weeks, the story they tell being one of sustained activity, with production much below unstinted demand. Buying in most parts of the country proceeds on an extensive scale, car shortages and embargoes have become more serious, vessels to take out exports are lacking, the scarcity of dyestuffs is acute, labor is in scant supply, jobs are more numerous than seekers, wages keep on rising, and large employers find it more profitable to placate their employees than to resist their demands. Better employment at relatively high wages has brought on increased demands for staple articles and enlarged savings accounts.

Dry Goods Economist—The prolongation of winter has caused some delay in the progress of spring buying. For some weeks, in fact, the weather conditions throughout a large section of the country have checked retail distribution. Merchants also complain of delays in the transportation of goods. Circulars sent out by big freight handling organizations asking the coöperation of shippers show that efforts are being made to overcome the congestion, but this condition must still be reckoned with in placing orders for early delivery. Further evidences of the heavy purchases recently made by retailers are presented in reports from Chicago wholesalers.

American Wool and Cotton Reporter—The wool market has been quiet for the week under review. In London attempts are being made to lower the cost of wool, which has caused a hesitancy in the market. Manufacturers, moreover, seem to be fairly well supplied for the present. Those dealers who were holders of territory wools did a good business and the supply of this grade is becoming low. While contracts in the West have been selling rather freely for some time, the wool growers have recently been maintaining a firmer policy.

ATLANTIC SEABOARD

BOSTON

Weather continues unfavorable to coastwise movement. Pocahontas and New River accumulate at Hampton Roads. Prices would be subject to discount if any spot market developed. Georges Creek still scarce. Pennsylvania operators sound out the market. Embargoes still the rule. Anthracite coming forward very slowly.

Bituminous—Cold weather is lasting so long that conditions are much more like mid-winter than early spring. Coastwise movement continues slow and irregular, causing larger accumulations at the Hampton Roads piers and for the moment an active demand for bottoms. Some shippers of Pocahontas and New River would eagerly shade the $2.85 price today if they could move some of the coal standing, but because of high marine freights there is practically no cargo demand in this market outside of regular contract requirements.

It will not be long now before factors here will be called upon to make deliveries on the sales made last October at prices from $3.35 to $3.50 on cars, Boston. To small consumers who did not close contracts at that time the price for contracts now is about $5 flat. A few weeks ago $4.65 was named for a year, but it is conceded that even that basis is much too high to prevail throughout the season.

For inland delivery, coal at Boston and Providence is in good request. At Providence, in particular, the railroad is in such poor shape for motive power that the congestion gets worse instead of better. Several manufacturers up to 25 miles away are relying on motor trucks to bring their coal supply. Meanwhile, the discharging arrangements of various distributors are seriously disturbed. Prices are firm at around $5.25 on cars, Providence, but the movement is so uncertain that consumers on the whole are diffident about buying.

Georges Creek continues in short supply at all the loading ports. In some cases barges have been towed light from Baltimore to Hampton Roads because of the detention at Curtis Bay and at Port Covington. Agencies for the Pennsylvania grades continue to canvass for next season business, but so far no significant results can be reported. Buyers and sellers are deadlocked as to the prices that should prevail and it remains to see how marine freights will turn during April.

Anthracite—New England is short of domestic sizes at practically all points. All-rail embargoes have been raised in some directions, but it is understood they are likely to be effective again after a few days. On the coast barge movement is still handicapped by the weather. Broken coal is very short at the New York piers and stove is also hard to get in any quantity. The congestion at several of the piers is so great that practically no shipments are made for two or three days at a time. If the public realized how low Eastern stocks are there would be a hard situation facing the retailers.

Bituminous prices, f.o.b. loading port at points designated, are about as follows, per gross ton:

	Philadelphia	New York	Baltimore	F.o.b. Mine
Clearfields	$2.60@3.00	$2.90@3.30	.....	$1.35@1.75
Cambrias and Somersets	2.80@3.25	3.10@3.55	.....	1.55@2.00
Georges Creek	3.75@3.85	4.00@4.15	.....	.....

Pocahontas and New River are quoted at $2.80@2.85 f.o.b. Norfolk and Newport News, Va. On cars at Boston and Providence, Pocahontas and New River are quoted at $5.25@5.50.

NEW YORK

Anthracite market inactive. Deliveries hampered by frozen coal, while loaded boats find a ready market. Steam grades in good demand with prices stiff. Bituminous situation uncertain. New contract prices advance. Shippers complain of car conditions.

Anthracite—The chief interest in the anthracite market centers on the possible outcome of the wage conferences. The market is inactive due principally to the failure of shippers to get coal for immediate delivery, besides which dealers who are not pushed with orders are not anxious to put in supplies at this season. While there is plenty of coal at the docks, nearly all of it is frozen and shippers are unable to take care of their customers as they would like to. Loaded boats were in good demand the early part of the week. Car supply continues short and the railroads are jammed with loaded cars between Tidewater and the mines. Some shippers believe the situation will grow worse before getting better. The harbor situation was somewhat relieved early this week by the New Haven road lifting its embargo on anthracite for four days, which enabled many cars to be diverted into New England to relieve conditions there.

Individual coals in some instances are being quoted at from 10 to 20c. off company circular. Pea coal is steady at from $3.75 to $4. Of the steam grades buckwheat No. 1 is the strongest, some quotations being made at from $3.50 to $3.75, f.o.b. No. 2 buckwheat is scarce, prices ranging from $2.65 to $2.75, and No. 3 buckwheat at from $2.30 to $2.40.

It is said that some of the companies are drawing on their storage piles for sufficient steam coals to meet the prevailing heavy demand.

Bituminous—No relief is in sight for the bituminous coal market at Tidewater. While there is plenty of coal at the docks, most of it is frozen and boatmen have become discouraged and advanced their rates to 30c. above harbor deliveries. Most boat owners also insist upon a guarantee that the vessel must be discharged in eight calendar days. Shippers with orders running from 300 to 400 tons are having trouble in getting boats, most vessels of this size being under charter. One shipper early this week estimated there were about 1,000 vessels of all sorts at the lower docks waiting for cargoes.

Contracts are taking a good deal of attention but most shippers are awaiting the outcome of the wage negotiations in central Pennsylvania. At present contracts for good coals are being closed at from $1.50 to $1.85 at the mines, or from 25 to 30c. above last year's prices.

Local harbor conditions are troublesome. Demand is good but shippers are unable to make deliveries. Loaded boats, alongside prices, are from 50 to 75c. higher than f.o.b. quotations, the latter ranging from $3.25 to $3.75. Mine quotations are as low as $1.30.

Current quotations on various coals, gross tons, f.o.b. Tidewater, follow:

	South Amboy	Port Reading	St. George	Mine Price
Georges Creek Big Vein	$4.25@4.50	$4.25@4.50	$4.25@4.50	$2.75@3.00
Georges Creek Tyson	3.50@3.75	3.50@3.75	3.50@3.75	1.95@2.20
Clearfield: Medium	3.25@3.50	3.25@3.50	.....	1.70@1.95
South Forks	3.50@3.75	.....	.....	1.95@2.20
Nanty Glo	3.35@3.60	.....	.....	1.80@2.05
Somerset County: Medium	3.25@3.50	3.25@3.50	3.25@3.50	1.70@1.95
Quemahoning	.....	3.45@3.60	3.45@3.60	1.90@2.05
West Virginia Fairmont	.....	3.10@3.20	3.10@3.20	1.35@1.45
Fairmont mine run	.....	3.00@3.10	3.00@3.10	1.15@1.25
Western Maryland	.....	3.00@3.25	3.00@3.25	1.45@1.70

PHILADELPHIA

Surplus anthracite caused by embargoes at Tidewater. State tax is being refunded. Most sizes fairly active, except chestnut. Bituminous quiet with strict embargoes via rail and water. Effect of labor settlement discounted.

Anthracite—With Port Liberty and Port Reading embargoed there is too much prepared coal coming into Philadelphia for rail delivery, especially on the Reading tracks, and the wholesale business is due for a sudden slump. There are a few isolated cases on the Pennsylvania road where dealers are short of coal, but on the whole the market is well supplied. Some of the sales agents show a tonnage for the first two weeks of the month equal to that for the entire month of March last year, but there is some doubt whether this rate can be maintained.

The big business has been confined to the companies. They are enjoying most of the prosperity and have no difficulty in securing circular prices for all their family coal and even above the circular for all the surplus of steam sizes. At this time a year ago the individuals were offering the prepared sizes at April circular and one or two of the big companies did likewise to a few selected buyers.

Broken coal has shown no weakness. Several of the larger buyers who hold contracts at $3.35 have recently made purchases of any available surplus tonnage at the circular price of $3.60. Egg is strong in the suburban districts and large orders have been placed at $3.85. March has really been a good month for this size. Stove loses none of its popularity and the production is all being sold at $4.10. Chestnut is a little disappointing and the orders still do not warrant drawing on the storage yards. The new business is only sufficient to absorb the current production at the prevailing price of $4.25.

There seems to be no limit to the new business on pea size, and while the price does not advance above the circular of $2.55, except on a few special coals, the limited car supply blasts all hope of satisfying the demand before Apr. 1. The car supply continues badly deranged and one large company was even compelled to dump in its storage yard sizes of coal in demand simply because the cars in which they were loaded were prohibited from being moved to the only points to which these cars could naturally be routed.

The prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond are on about the following basis at the present time:

	Line	Tide		Line	Tide
Broken	$3.60	$4.85	Pea	$2.55	$3.30
Egg	3.85	5.10	Buckwheat	1.55	2.30
Stove	4.10	5.10	Rice	.90	1.80
Chestnut	4.25	5.35	Barley	.55	1.30

Bituminous—The bituminous market just about holds its own, displaying a slight show of strength on slack, which continues in strong demand at an increase of 5c. to 10c. per ton. However, it is believed that the downward tendency of prices has not been permanently checked and there are likely to be further recessions for some weeks to come. The present slight recovery is due more to the embargoes which have practically cut off new shipments out of the city, and also on account of the car shortage, rather than any excessive demand.

There also seems to be more disposition on the part of both shippers and consumers to come together on the contract question. Some little business was closed this week, although no real activity is apparent and there will not be much until Apr. 1 is actually passed and transportation conditions also become more settled. Shippers of tidewater bituminous are now laboring under the added disadvantage of the first embargo in years laid against Port Richmond piers of the Philadelphia & Reading Ry. Of course the principal effect is felt in coastwise shipments, as the export business has practically vanished, with only 35,000 tons being shipped during the past month.

Prices per gross at the mines are about as follows:

Georges Creek Big Vein	$2.25@2.50	Fairmont gas, ¾	$1.65@1.75
South Fork Miller Vein	1.85@1.95	Fairmont gas, mine-run	1.40@1.50
Clearfield (ordinary)	1.60@1.70	Fairmont gas, slack	1.40@1.45
Somerset (ordinary)	1.50@1.60	Fairmont lump, ordinary	1.40@1.50
West Va. Freeport	1.40@1.50	Fairmont mine-run	1.25@1.35
		Fairmont slack	1.35@1.45

BALTIMORE

Contract market firm at good prices, but spot coals are cheap. Embargoes still in force. Large accumulations for export with vessels slow reporting. Cool weather maintains anthracite demand.

The best feature of the trade is the contract market, which remains quite firm. Prices in many cases are from ten to twenty cents ahead of last year. Consumers have been inclined to hold off in the face of this increased demand, but are now beginning to come in.

Spot coals sell cheaply because of the restricted market, due to the rail embargoes. Prices to the trade on this class of business are about as follows: Georges Creek Tyson, $1.75; Clearfield, $1.50; South Fork, $1.60; Latrobe, $1.30; Somerset, $1.50; Freeport, $1.15; Fairmont three-quarter, $1; mine-run, 90 to 95c., and slack, $1.20.

While export movement from Baltimore the past week was not heavy, amounting to but 11,423 tons, considerable fuel was piled up at the piers here this week awaiting bottoms that are delayed in reporting.

Cool weather keeps up a brisk demand for anthracite from householders, whose winter's supply has run out.

HAMPTON ROADS

Dumpings not so heavy but shippers are occasionally short of coal. Indications are for a light month. Old circular price prevails.

The dumpings over the various piers have not been as heavy as was anticipated. The accumulation in the railway yards is above normal, although a number of the larger shippers are somewhat short of tonnage and are pushing the railroads to hurry coal forward. On the other hand, some of the shippers have used up their allotment of cars and are compelled to hold off shipments to tidewater.

Circular prices are being quoted but few if any sales are being made at these prices. A fair estimate of the actual selling price for standard smokeless would be around the old circular of $2.85. There is little demand at this time for high volatile, although some of this grade is moving on contract. The movement of nut and slack is also practically confined to contract business.

Bunker movement during the week has been rather light and there has also been little coal taken by the government. The indications at the present time are that the movement for the month of March will be below the February figures.

While there is no surplus of vessel tonnage on the market at the same time there appears to be somewhat less of a demand for prompt vessels.

Railroad Tonnages—Dumpings over the local piers for the past five weeks compare as follows:

	Week Ending				
Railroad	Feb. 12	Feb. 19	Feb. 26	Mar. 4	Mar. 11
Norfolk & Western	158,265	121,156	156,521	119,920	126,540
Chesapeake & Ohio	106 525	71,513	87,450	84,849	75,525
Virginian	63,056	92,243	78,463	66,912	68,598
Totals	327,846	284,912	322,434	271,681	269,663

Ocean Charters and Freights

COASTWISE FREIGHTS

Storms along the seaboard have given a spurt to the freight market, but it is felt that the advance is only temporary and due to the urgent calls for tonnage just at this time. From Hampton Roads to Providence and New Bedford rates jumped from $1.50 to $2 within a few days, and $2.25 is the market today on fair-sized carriers to Boston, but the number available for reasonably prompt loading is small.

Boats for New York loading have also advanced from 65@70c. to 90c. to points on Long Island Sound. Rigid demurrage rules are still imposed, the accumulation of boats at all the piers being something unprecedented.

VESSEL CLEARANCES

The following steamers have cleared from various ports during the two weeks ended Mar. 11.

NEWPORT NEWS

Vessel	Destination	Tons
Cresent[4]	Santiago	940
Munorway[4]	Havana	5,700
H. T. Scott[4]	Havana	2,000
Wellington[14]	Genoa	7,923
Sverre*[4]	Rio Janeiro	5,000
Mount Vernon[4]	St. Jago	1,100
J. G. McCullough[4]	Santiago	
Mercator[4]	Vera Cruz	
Harald[4]	Havana	4,600
H. Luckenbach[4]	Buenos Ayres	6,300
Mayaro[4]	Georgetown	1,300
Nereus[14]	Gibraltar	6,000

* See also under charters.

BALTIMORE

Pietro	Italy	5,405
Plymouth	Egypt	6,018

NORFOLK

Vessel	Destination	Tons
Barbara[12]	St. Georges	1,147
E. H. Cole[2]	San Juan	2,328
Rosalia L.[12]	Genoa	7,467*
E. Sewall	Rio Janeiro	5,190
M. Thomas[12]	Hamilton	1,700
Westmount[11]	Spezia	2,404
A. Parodi[12]	Genoa	4,684†
M. Baxter[13]	Para	2,325
Kronborg[13]	Barbadoes	5,238
Val Salice[12]	Naples	
Plymouth[11]	Spezia	5,191
Battinin Accame[12]	Bagnoli	
Egda[6]	Buenos Ayres	3,917
Iavan[6]	Rio Janeiro	4,064
Glenmount[3]	Vera Cruz	2,545
Coniston[12]	Spezia	
Il Piemonte[12]	Genoa	
Nordlwalen[3]		4,371
F. Luckenbach	Santo	3,481
O. H. Brown**	Havana	1,556
Oceano[13]	Genoa	5,743
Maria C.[12]	Genoa	3,421

* Also 1098 tons of coke. † Also 480 tons coke. ** See also under charters.

[1] Atwater & Co. [6] Castner, Curran & Bullitt [11] New River Coal Co.
[2] Baker Whiteley [7] Chesapeake & Ohio C. & C. Co. [12] Pocahontas Fuel Co.
[3] Barber & Co. [8] Crozer-Pocahontas Co. [13] Smokeless Fuel Co.
[4] Berwind-White [9] Hasler Brothers [14] C. H. Sprague & Son
[5] C. G. Blake Co. [10] Flat Top Fuel Co.

OCEAN CHARTERS

The following charters have been reported from various sources during the past two weeks:

VIRGINIA

Vessel	To	Tons	Rate
Ruth	River Plate	2,222	$22.80
Arizonan[1]	Rio Janeiro	5,620	17.25
Volumbian[1]	Rio Janeiro	5,598	17.25
Iowan[3]	Rio Janeiro	4,064	17.25
Kanawha	Brazil	1,906	
Finn	Rio Janeiro	2,473	
Clifford[3]	Pernambuco	1,378	16.00
Artisan[3]	South America		
Sverre[4]	Rio Janeiro	2,326	15.00
J. G. McCullough	Tampico	1,604	
Ioanna	Port Militar	2,224	23.40
O. H. Brown	Havana	959	
Bacchus	River Plate	1,401	24.60
New Orleans	Havana	1,017	4.50

[1] For two trips, 1,000 tons discharge.
[2] From Norfolk. [3] Newport News.
[4] Two trips; discharge and port charges.

PHILADELPHIA

Vessel	To	Tons	Rate
M. Pickands	Lisbon	873	
Murjeck	Norway	2,326	
Edmands	Manzanillo	438	$6.50
Aztec	Brazil	2,298	
Valdivia	Chile	1,020	

BALTIMORE

Unbe Neudi	Buenos Ayres	2,664	$24.00
Hilton	Tampico	2,324	
Yamato Maru	River Plate		21.60
Flores	River Plate		21.60
F. J. Lisman	Bocas del Toro		
M. F. Barrett	Rio Janeiro		16.00

OCEAN FREIGHTS

The freight market advanced very rapidly during the past week, the last charters on coal to Rio being at $19.50 net with 1,000 tons per day discharge, and to the Lower Plate at $24.60 with 1,000 tons per day discharge "Grainhome" conditions, the latter being a small boat of about 2,000 tons and the rate probably a little over the market. We have chartered numerous steamers the last week for export coal, and find that the advance in rates is bringing out more tonnage.

Freight rates on coal by steamer are about as follows:

To	Rate	To	Rate
Havana	$4.50@4.75	Bermuda	$5.00
Cardenas or Sagua	6.00	Vera Cruz	7.00@8.00
Cienfuegos	5.50@6.00	Tampico	7.00@8.00
Port au Spain, Trinidad	7.50@8.00	Rio Janeiro	19.50[4] about
St. Lucia	7 50@8.00	Santos*	19.50[4] about
St. Thomas	7.00@7.50	Montevideo	24.00@25.20[1]
Barbados	7.50@8.00	BuenosAires orLa Plata	24.00@25.20[1]
Kingston	6.00 about	Rosario	26.40@27.60[2]
Curacao	7.25[3]about	West Coast of Italy	27.60@28.80
Santiago	5.50 about	Barcelona[5]	25.20@26.40**
Guantanamo	5.50 about	Valparaiso or Callao	18.00
Demerara	9.00@10.00	Marseilles	26.40@27.60

* Consignees paying dockage dues. ** Spanish dues for account.
[1] 500 tons discharge @ 30c. [2] 500 discharge. [3] And p.c. [4] Net, 1,000 tons discharge. [5] Or other good Spanish port.
W. W. Battie & Co.'s Coal Trade Freight Report.

OHIO VALLEY

PITTSBURGH

Market continues soft on account of wage settlement. Contract negotiations proceeding slowly.

Negotiations on coal contracts for the twelvemonth are proceeding rather slowly. There is a great deal of business under consideration but buyers and sellers are far apart and the buyers do not seem to think there is any occasion for haste in closing. Some confusion results from the nature of the wage concessions made to the miners in the recent settlement, whereby coal consumers are taking time to consider just what the arrangement may mean by way of increased cost in mining coal.

The spot market is rather irregular, with quite a range of views as to prices by different operators. There is only a fair volume of demand as ordinary consumers are well covered by their contracts. A definite difference exists between different districts, Pan Handle being rather well established at a minimum of about $1.15, while Youghiogheny gas coal seems to be fairly firm at $1.30.

While there was very little stocking of coal when prices were high there is now a drawing upon stocks which affects the market demand for coal, and in addition the holders of contracts are taking smaller tonnages than formerly as they see their way clear to reducing their stocks.

We quote free coal as follows: Slack, $1.10@1.15; mine, run, $1.15@1.30; ¾-in., $1.25@1.40; 1¼-in., $1.35@1.50, per net ton at mine, Pittsburgh district. Contract prices are not definitely quotable, but would run well above the minimum of these figures, particularly on mine-run.

BUFFALO

Fair bituminous trade, but much difficulty from car shortage and blockades. Slack scarce. Anthracite selling well. Winter season about over.

Bituminous—There is quite a good volume of coal moving and at fair prices on the average. There is a heavy demand for slack, so that all the short-rate stock is taken up and as there is an embargo on certain Pittsburgh and Panhandle coal it is hard to get a supply. If the Lake trade sets in strong there will be a shortage of slack for sometime. The turn of the market has about cut off the Ohio No. 8 coal for the present. It has sold here in large quantities for months, as it could be laid down in this market for considerably less than other bituminous. There is now report that certain New England points are running short of coal.

The Buffalo price lately made by Pittsburgh shippers is now rather low, slack shippers being able to sell it generally as high as $2.50.

Anthracite—The trade has been fairly strong of late. Winter has held more steadily than was expected and though there has been much selling of independent at prices somewhat below circular and some shipping on April prices, whatever they may be fixed at, the demand for regular consumption has been larger than was looked for and the March total promises to be heavy unless spring weather appears soon. There is about as much complaint of car shortage in this trade as in bituminous. Had there been a rushing demand at any time lately it would have been impossible to fill the orders. The loading of anthracite into Lake vessels here has stopped for the present, as no trestles are ready to handle it.

TOLEDO

Lake freighters being overhauled for an early spring movement. No freight congestion on local market.

The spring movement of the Pittsburgh Steamship Co.'s fleet from its winter quarters at Bay View Park has begun and repairs are now under way on the big Lake freighters. It is the general expectation here that the Lake movement will be unusually heavy this season and that it will begin at the earliest possible moment. The demand from the upper docks will be large and the ore movement is expected to be heavier than ever before. Pocahontas is inclined to show weakness as are most other grades because of the extreme congestion at Tidewater. The difficulties attendant on moving coal in the Eastern seaports is throwing the surpluses back on the local market and creating a weakening tendency. The freight congestion which seems so noticeable in other lines has not affected the local market as yet.

DETROIT

Less demand for steam coal and no interest in domestic and anthracite grades. Lake transportation contracts slow in closing. Coke supply short.

Bituminous—With industrial conditions active and seeming to justify an increased consumption of steam coal shippers still complain that the market is unsatisfactory. Consumers apparently have lost interest in buying, not to the extent of discontinuing orders, but by holding off and skimping on quantity. Fine coal is commanding the most interest, but there is a moderately active inquiry, also, for three-quarter lump. Smokeless finds a ready market, but prices show a tendency to fluctuate from day to day. Retail yards, relieved of pressing orders from consumers are not interested in renewing their supplies, even though stocks are low.

Lake Trade—Shippers evince no haste to close contracts for transportation to Lake Michigan ports. A rate of 35c. or higher is likely to be paid as vessel owners are not anxious for the business, when downbound grain cargoes pay five cents a bushel from Lake Superior ports for the opening trips and four cents on subsequent trips as far ahead as June.

COLUMBUS

Domestic trade quiet, due to unfavorable weather conditions. Steam business more active, but the stocking operations have ceased.

Mild weather, coupled with the agreement on the wage scale, have softened the market in Ohio during the past week. Retailers are only buying what is absolutely necessary for present needs. Steam business is more active, although not so strong as several weeks ago. On the whole, the tone of the market is fair and the outlook favorable.

Factories making iron and steel products are taking a good tonnage; other lines of manufacturing are also active and the whole tendency is toward a large consumption. Stocks on hand are rather large and the stocking movement has now entirely subsided. Demand for railroad fuel is good as the freight movement is increasing.

Retail trade is rather quiet as most of the householders have sufficient supplies for the present. In rural sections roads are in better condition for hauling and retail trade is much better. Rural dealers are buying fairly well for the time of the year and prices are rather firm.

Pocahontas is becoming stronger as the spring season advances. Anthracite is also in good demand and the same is true of coke. West Virginia splints are selling fairly well. Car shortage is interfering with shipments from West Virginia.

	Hocking	Pomeroy	Eastern Ohio		Hocking	Pomeroy	Eastern Ohio
Re-screened lump....	$1.60	$1.65	.....	Mine-run.....	$1.15	$1.15	$1.05
Inch and a quarter..	1.50	1.50	$1.40	Nut, pea and slack	.90	.95	.90
Three-quarter-inch.	1.35	1.40	.....	Coarse slack.....	.80	.85	.80
Nut.....	1.25	1.30	.....				

CINCINNATI

Some domestic orders have resulted from the cold weather. Steam demand has eased off a trifle. Car supply is still very poor.

Continued cold weather last week brought more retailers into the market. The buying was from hand to mouth, however, and designed only to tide over the remainder of the cold weather. The trade is now looking forward to the opening of the Lakes as nothing much can be expected before then. A differential of about 10c. has been reëstablished on mine-run over nut and slack, indicating either a lessened demand for the latter or an improved call for the former. The market is largely maintained by the car situation, a 50 per cent. supply being about the average all through the West Virginia field. With normal transportation conditions it is obvious that the market would face a heavy over-supply.

COKE

CONNELLSVILLE

Two contracts for furnace coke at $3, but no further contract inquiry. Spot coke in light demand. Shipments decreased.

Two contracts have just been closed for furnace coke, each at $3, one for about 8,000 tons a month, March to December, inclusive, and the other for about 10,000 tons a month, July to December. In general operators regard conditions as justifying somewhat higher prices than these on contract, and are disposed to quote $3.25 or $3.50. As there is no active inquiry for contract coke they may modify their views on the appearance of further inquiry.

Consumers appear to be satisfied that no important advance will occur, as the completion of byproduct ovens will increase supplies from time to time. The addition of 214 byproduct ovens at South Bethlehem is now nearly completed, fully half the ovens being in blast, while the Toledo plant of 94 ovens is expected next month, with Dover and the Youngstown Sheet and Tube Co. plants in June and La Belle and the Cleveland plant in July, making a total of some 800 addi-

tional byproduct ovens to be completed within the next few months, to make 150,000 or 200,000 tons of coke a month.

Last Saturday there was a sale of spot furnace coke at $3.75, but in general it has been possible the past few days to pick up some lots at $3.50. Foundry coke is rather dull. We quote: Spot furnace, $3.50@3.75; contract, $3@3.25; spot foundry, $3.75@4; contract, $3.25@3.75, per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Mar. 4 at 444,342 tons, a decrease of 918 tons, and shipments at 438,038 tons, a decrease of 19,800 tons.

Buffalo, N. Y.—The trade is not quite as strong as it was, though prices remain about as formerly. Shippers have for some time tried to divert their coal all into this trade, rather than to sell it as coal, but the car shortage has made it impossible to break down the prices. There is no apparent falling off in the demand and the reports that stocks of ore on Lake Erie docks are lighter than they were a year ago show that an active season is opening. New shipments of ore may be laid down on these docks inside of a month. Coke prices remain at $5.85@6 for best 72-hr. Connellsville foundry and $5.10@5.25 for 48-hr. furnace.

Detroit—Dealers report an unusual scarcity of coke. Many of the retailers are unable to supply it and some refuse to take orders. The Semet-Solvay Co. and the Detroit City Gas Co., large producers of the product are weeks behind in filling orders.

St. Louis—Coke is in good demand and consumption by the industrial users is large. Domestic demand has slumped off considerably owing to moderate weather. The dealer is cleaning up his supply with the ending of the season. The following prices per net ton are in effect, f.o.b. cars, St. Louis: Byproduct (all sizes), $5.25; gashouse (lump and egg), $4.50; petroleum (lump), $6.25.

MIDDLE WESTERN

ST. LOUIS

Market suffers a heavy slump. Domestic buying light. Industrial companies cease storing. Screenings weaker.

The agreement on a new wage scale has lifted the suspense of the past two or three months and brought about the expected slump. The railroads are asking for cancellation of all unfilled storage orders and have also curtailed requisitions for current consumption. Industrial demand has toned down to actual requirements with further storage abandoned. The continued springlike weather has put a serious check on domestic orders, the retail dealer having retired almost completely from the market. The dealer contracted for a specified tonnage is hard pressed to place it.

Orders for Williamson and Franklin County lump and egg are lagging, while nut sizes are in fairly good demand. Screenings are somewhat weaker, having settled back slightly with more offerings in the market than for some time.

The Montgomery County, Staunton and Mt. Olive districts are likewise suffering from the sudden recession and it is reported many large industrial and railroad storage orders were cancelled during the week. Prices for the coarser sizes are tending downward, while screenings and small washed sizes remain firm and fairly active.

The intermediate and Standard fields are virtually at a standstill. A light volume of coal is moving but chiefly on contract. Great efforts are required to secure orders. Low prices offer no inducement. Lump, egg, nut and mine-run have dropped back 5 to 10c. per ton. Screenings are holding up but display a tendency to weakness. That the active period of the season has ended is generally accepted.

Following is the range of prices, per net ton, f.o.b. cars at mines:

	Williamson and Franklin	Staunton and Mt. Olive	Montgomery Co.	Intermediate	Standard
8-in. lump..	.....	.....	.....	$1.15@1.40	$1.05@1.15
6-in. lump..	$1.40@1.75	$1.25@1.40	$1.25@1.50	1.15@1.40	1.05@1.15
3-in. lump..	1.40@1.75	1.25@1.35	.....	1.15@1.40	.....
2-in. lump..	1.25@1.50	1.15@1.25	.....	1.10@1.20	.85@1.00
1½-in. lump.	1.40@1.50	.....	1.15@1.25	1.05@1.15	.85@1.00
6x3-in. egg..	1.40@1.75	.....	1.25@1.40	1.15@1.40	1.05@1.15
6x2-in. egg..	.....	.....	1.15@1.25	1.10@1.20	.80@1.00
6x1½-in. egg	1.25@1.50	.....	1.15@1.25	1.05@1.15	.80@ .95
No. 1 nut..	1.25@1.50	.....	1.15@1.25	1.05@1.15	.85@1.00
No. 2 nut..	1.15@1.40	.90@1.00	.....	.90@1.05	.80@1.00
Mine run...	1.05@1.15	1.05@1.15	1.05@1.15	1.00@1.10	.80@ .95
Screenings..	.80@ .90	.75@ .90	.75@ .90	.70@ .80	.70@ .80
Washed					
No. 1 nut..	1.60@1.75	1.40@1.50	.....	1.40@1.50	1.40@1.50
No. 2 nut..	1.40@1.60	1.25@1.40	.....	1.25@1.40	1.25@1.40
No. 3 nut..	1.40@1.60	1.25@1.35	.....	1.25@1.35	1.25@1.35
No. 4 pea..	1.25@1.50	1.15@1.25	.....	1.15@1.25	1.15@1.25
No. 5 slack.	.80@ .90	.80@ .90	.....	.75@ .85	.75@ .85

CHICAGO

Quotations in the Chicago market are as follows:

	Williamson and Franklin Co.	Springfield	Sullivan	Clinton	Knox and Greene Cos.
Lump.....	$1.50@1.75	$1.50@1.60	$1.50@1.60	$1.50@1.65	$1.45@1.60
Steam lump	1.35	1.25@1.30	1.25@1.35	1.30@1.35	....
2½ and 3-in. lump.....	1.50@1.75	....	1.30@1.35	....	1.30@1.35
1¼-in. lump.	1.40@1.50	....	1.25	1.25@1.30	1.25
Egg	1.50@1.75	1.50@1.60	1.25@1.30	1.15@1.25	1.15@1.25
Nut	....	1.45@1.50	1.20@1.25	1.10@1.15	1.10@1.15
No. 1 washed	1.60@1.75	....	1.50	....	....
No. 2 washed	1.40@1.50	....	1.40	....	....
No. 1 nut..	1.50@1.75	....	....	....	....
No. 2 nut..	1.40@1.60	....	....	....	....
Mine-run...	1.10@1.25	1.10	1.00@1.10	1.05@1.10	1.10@1.15
Screenings..	.95@1.00	.90@ .95	.85@ .90	90@ .95	.95@1.00

	Harrisburg & Saline Co.	E. Kentucky	Pocah. & W.Va.Smok'l.	Penna. Smokeless	Hocking
Lump.....	$1.50@1.60	$1.50@2.40	$1.50@1.75	$1.60@1.75	$1.60@1.75
1¼-in. lump.	1.25	....	....	....	1.40@1.50
Egg	1.50@1.60	1.35@1.85	1.50@1.75	1.50@1.75	....
Nut.....	1.40@1.50	1.25@1.50	1.40@1.50	1.50	....
No. 1 nut..	1.50@1.65	....	....	....	....
No. 2 nut..	1.40@1.50	....	....	....	....
Mine-run...	1.10@1.25	1.10@1.15	1.25@1.40	1.25@1.40	1.15@1.25
Screenings..	.95@1.00	.90@ .95	....	....	95@1.15

PRODUCTION AND TRANSPORTATION STATISTICS

CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for January and the seven months of the fiscal years 1915 and 1916, in short tons:

	January				Seven Months			
Destination	1916	%	1915	%	1916	%	1915	%
Tidewater.....	500,892	22	299,676	18	3,022,405	20	2,097,133	17
East.....	249,632	11	209,624	12	1,561,633	10	1,492,374	12
West.....	1,302,484	58	1,113,588	66	9,239,009	61	8,436,425	66
	2,053,008		1,622,888		13,823,047		12,025,932	
Total.....			187				187	
From Connections								
Bituminous....	189,179	9	66,696	4	1,280,530	9	655,129	5
Anthra. (local).	58		70		1,209		105	
Anthracite.....	1,226		769		9,500		9,604	
Total.....	2,243,471	100	1,690,610	100	15,114,286	100	12,690,957	100
Coke.....	46,521		11,437		240,461		102,314	

ANTHRACITE SHIPMENTS

Anthracite shipments for February and the first two months of 1915-16 were as follows:

	February		2 Months	
	1916	1915	1916	1915
Phila. & Reading.....	1,074,148	693,743	2,181,047	1,454,500
Lehigh Valley.....	997,630	887,267	2,015,728	1,841,339
Cent. R.R. of N.J.....	597,694	473,928	1,221,554	1,082,224
Del. Lack. & West.....	839,472	630,246	1,699,702	1,205,784
Del. & Hudson.....	609,325	544,325	1,236,284	1,168,272
Pennsylvania.....	504,332	372,374	1,145,240	823,574
Erie.....	699,700	535,883	1,366,694	1,112,890
Ont. & Western.....	185,896	137,341	360,916	321,059
Lehigh & New Eng.....	188,109	74,808	353,491	173,872
	5,696,306	4,349,915	11,580,656	9,183,514

Stocks at Tidewater Feb. 29 were 416,078 tons.

FOREIGN MARKETS

GREAT BRITAIN

Mar. 2—Steam coals show some irregularity. Owing to tonnage shortage supplies of some qualities for prompt shipment are available on slightly easier terms. Quotations are approximately as follows:

Best Welsh steam.....	Nominal	Best Monmouthshires....	$8.04@8.16
Best seconds.....	Nominal	Seconds.....	7.80@8.04
Seconds.....	$8.16@8.40	Best Cardiff smalls.....	4.08@4.30
Best dry coals.....	8.40@8.64	Cargo smalls.....	2.40@3.12

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freight—Tonnage is extremely difficult to obtain and outward chartering is very restricted. Rates are approximately as follows:

Gibraltar.....	$9.48	Naples.....	$19.20	St. Vincent.....	$10.50
Marseilles.....	17.40	Alexandria.....	19.20	River Plate.....	12.00
Algiers.....	14.47	Port Said.....	19.20		
Genoa.....	19.80	Las Palmas.....	9.60		

Financial Department

Jefferson & Clearfield Coal & Iron Co.

This company reports, in part, for the fiscal year ended June 30, 1915, as follows:

	1914-15	1913-14	1912-13	1911-12
Gross earnings	$2,161,503	$2,556,271	$2,651,195	$2,126,023
Expenses and taxes	1,847,591	2,099,488	2,232,506	1,792,053
Net earnings	$313,912	$456,783	$418,689	$333,970
Bond interest	$247,328	$248,424	$237,154	$231,020
Sinking funds	55,000	58,280	57,215	55,000
Preferred dividend	(3½)56,250	(5)75,000	(5)75,000	(5)75,000
Total deductions	$358,578	$381,704	$369,369	$361,020
Balance, surplus or def.	def. $44,666	sur. $75,079	sur. $49,320	def. $27,050

BALANCE SHEET JUNE 30

Assets	1915	1914	Liabilities	1915	1914
Coal lands	$5,952,129	$6,051,805	Common stock	$1,500,000	$1,500,000
Bonds in sink. fund	1,447,000	1,329,000	Preferred stock	1,500,000	1,500,000
Cash	94,376	53,639	Funded debt	3,498,000	3,614,000
Bills receivable	57,122	57,122	Held by skg. fd. trus	1,447,000	1,329,000
Material on hand	7,162	3,747	Accrued interest, etc	18,831	31,108
Coal and coke on hand	43,590	31,003	Individuals and companies	340,452	326,650
Individuals and companies	434,329	660,928	Sink. funds accrued, etc	30,028	34,498
Construction and equipment	1,171,857	1,068,200	Profit and loss	873,254	920,188
Total	$9,207,565	$9,255,444	Total	$9,207,565	$9,255,444

Central Coal and Coke Co.

The annual report of the Central Coal and Coke Co. for the fiscal year ended Jan. 1, 1916, shows net earnings for the year of $185,597, compared with $318,921 and $544,044 respectively in the two previous years. The comparative statements of earnings by departments compares for three years ended Jan. 1 as follows:

Credit	1916	1915	1914
Wholesale coal department	$291,511	$392,620	$490,742
Retail coal department	18,884	12,465	28,124
Washery department	.....	.....	3,551
Mining store department	86,751	127,346	139,871
Wholesale lumber department	36,811	43,648	305,804
Carson mill department	.....	.....	169,275
Keith mill department	.....	.....	96,503
Miscellaneous	62,979	229	22,554
Rentals, coal department	28,272	50,402	31,493
Total	$525,211	$626,711	$1,287,922

Debit	1916	1915	1914
Roy credit coal lands	$108,198	$126,120	$126,663
Roy credit timber lands	.....	.....	339,865
General expenses	74,918	70,580	88,818
Interest on bonds	70,912	77,847	72,990
Dep. on washery property	2,672	4,008	4,008
Dep. on mill property	.....	.....	33,982
Dep. motor trucks	4,544	4,544	4,544
Interest and exchange	28,804	12,404	73,041
Washery department	1,528	1,064	.....
Live stock exting. reserve	19,875	11,580	.....
Total debit	311,454	307,790	743,918
Net earnings	213,757	316,921	544,004

A loss of $28,160 in the Delta Land and Timber Co. operations brought the net profit of the combined companies for the year to $185,597.

Note—For previous annual report of this company, see Vol. 6, p. 252.

Virginia Iron, Coal & Coke Co.

The thirteenth annual report of this company for the year ended June 30, 1915, reads, in part, as follows:

Pig-Iron Business—There was very little demand for pig iron throughout the year, and prices hovered constantly around the cost of production. We operated only one furnace, and even so increased our stock of pig iron 30,089 tons, making total stock on hand June 30, 114,284 tons. Economies substantially reduced the cost of iron manufactured and we hope to continue on the reduced cost basis.

The outlook for the ensuing year, based upon business already booked for delivery, is very encouraging, and we are in position to reap full benefit of the improvement in conditions.

Coal Business—Your coal mines produced during the year 1,713,800 tons at a profit of $405,242, as against a production of 1,988,000 tons at a profit of $449,775 for the preceding year. The washing plant at our Toms Creek colliery was completed and is fully meeting expectations.

Bonds—We have retired by purchase during the year $7,000 first mortgage bonds, costing $5,800, and $15,000 Carter Coal and Iron Co. bonds, costing $14,835, and have purchased real estate to the amount of $58,625.

EARNINGS FOR YEAR ENDING JUNE 30

	Year 1914-15		Year 1913-14	
Operation of	Gross	Net	Gross	Net
Furnaces	$803,631	def. $10,239	$1,743,405	$11,075
Foundries and shops	55,097	def. 6,687	95,293	def. 7,689
Coal mines	1,582,998	405,242	1,815,190	449,775
Coke ovens	196,737	6,337	428,341	28,561
Saw mills	70	.....	150	.....
Grist mills	205,632	11,921	180,129	6,689
Total	$2,844,165	$406,574	$4,262,508	$488,411

Note—For previous annual report of the company see Vol. 7, p. 150.

Pacific Coast Company

This company reports, in part, for the year ended June 30, 1915, as follows:

The net earnings of the Pacific Coast Coal Co., including lumber sales, decreased $264,034. General expenses and taxes decreased $3,698, and depreciation charged against ships was increased $18,405.

It will be noted that decrease in earnings is confined principally to the coal department and the railroad, which depends upon that department for its prosperity. The coal business continued greatly below normal throughout the year.

Dividends upon the common stock were suspended at the quarterly meeting in July. It is hoped that reasonably soon such a change will take place in conditions as to justify their resumption. Pending such change, your directors believe that sound business policy requires them to conserve the company's resources, in order that its credit and the efficiency of its properties may be maintained unimpaired.

The contemplated expenditures in Alaska the coming year by the United States Government should help general business in the Puget Sound country and so increase the demand for our steam coal, which the past year was less than 50 per cent. of normal.

The total output of the mines of the Pacific Coast Coal Co. was 490,434 tons, a decrease of 191,295 tons, as compared with last year. The amount of coal sold at all depots was as follows: From company's mines, tons, 458,587; other domestic coal, tons, 12,026; foreign coal, tons, 16,218; total, tons, 486,831; a decrease of 213,904 tons, as against last year. During the year 30,873 tons of briquettes were manufactured and 19,739 tons sold.

The coal business on this coast during the past year was the poorest it has been for many years. The war in Europe has demoralized offshore shipping to such an extent that bunkering of ships has decreased to a minimum. A number of mines have been closed down. Our company has been able to maintain a moderate profit because its mines are favorably situated and it has been able to obtain and hold a considerable portion of the house trade in Seattle, Tacoma, Portland and other Puget Sound and Columbia River cities and towns. Sales in Alaska increased slightly but profits were meager, on account of the keen competition by British Columbia coals, on which there is now no duty.

EARNINGS FOR YEARS ENDING JUNE 30

	1914-15		1913-14	
Department—	Gross Earns.	Net Earns.	Gross Earns.	Net Earns.
Pacific Coast SS. Co.	$3,670,034	$354,109	$3,779,753	$167,505
Pacific Coast Ry. Co. / Col. & P. Sd. R.R. Co.	588,004	104,178	674,173	146,022
Coal, lumber, taxes, &c.	2,026,035	222,133	2,609,724	512,158
Total	$6,284,073	$680,420	$7,063,650	$825,685

Note—For previous annual report of this company see Vol. 8, p. 788.